ILLINOIS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

PRODUCTION NOTE

University of Illinois at
Urbana-Champaign Library
Large-scale Digitization Project, 2007.

BIOLOGICAL AND SOIL SURVEY OF FAP 412 FROM OGLESBY, LASALLE COUNTY TO BLOOMINGTON, MCLEAN COUNTY, ILLINOIS
COMPONENT 2.2: BIRDS

FINAL REPORT

20 APRIL 1986

by

Patti L. Malmborg
Glendy C. Vanderah

For

Illinois Department of Transporation
Bureau of Location and Environment
2300 South Dirksen Parkway
Springfield, Il 62764

Section of Faunistic Surveys and Insect Identification
Technical Report 1986 (13)
13

TABLE OF CONTENTS

LIST OF FIGURES

(List of figures concluded in next page)

LIST OF FIGURES

LIST OF TABLES

(List of tables concluded on next page)

LIST OF TABLES

(continued) Page

INTRODUCTION

In conjunction with the proposed Illinois Department of Transportation project FAP 412, in which a four-lane highway will replace U. S. Route 51 between Bloomington in McLean County and Oglesby in LaSalle County, bird populations were censused within the project area during all seasons by the Illinois Natural History Survey (INHS) as requested by IDOT. Particular attention was given to federal and state endangered and threatened species, which, based upon past records and information about habitat preferences, were known or thought likely to occur within the project area. The purpose of this study is to aid in the evaluation of possible impacts that the proposed highway might have on bird populations.

OBJECTIVES: The objectives of this study were (1) to census bird populations during all seasons, (2) to generate relative abundance and frequency values for autumn, winter, and spring seasons, (3) to generate breeding bird density values for the breeding season, (4) to note all observations of endangered and threatened species, and (5) to comment on economically important species.

DESCRIPTION OF STUDY AREA

The proposed FAP 412 project consists of the construction of a new four-lane alignment of U. S. Route 51 extending 63 miles from Bloomington north to Oglesby, Illinois (Figure 1). The project area consists of a 1.5-mile corridor following the present alignment of Route 51, encompassing approximately 80 square miles. The project area is located in LaSalle, Marshall, McLean, and Woodford counties, Illinois.

This study area occurs in the Grand Prairie Section of the Grand Prairie Natural Division (Schwegman 1973). The presettlement vegetation was largely tall-grass prairie, while forests occupied the river valleys and moraines (Mohlenbrock 1975). The majority of the present habitat occurring within the project area is cultivated and continually disturbed. There are, however, wooded remnants that have persisted along the Mackinaw River and that occur around Evergreen Lake. Several small special habitat types also have been included because of their significance to bird species, *i. e.* wetlands, successional fields, etc. Census transects have been located within these habitat types (Figures 2, 3, and 4).

This report will discuss the bird populations which inhabit the major habitat types of the project area. Censuses were performed during autumn 1984, winter, spring, and the breeding season, 1985, on pre-determined transect routes that were proportionally distributed among these different habitat types (Figure 2).

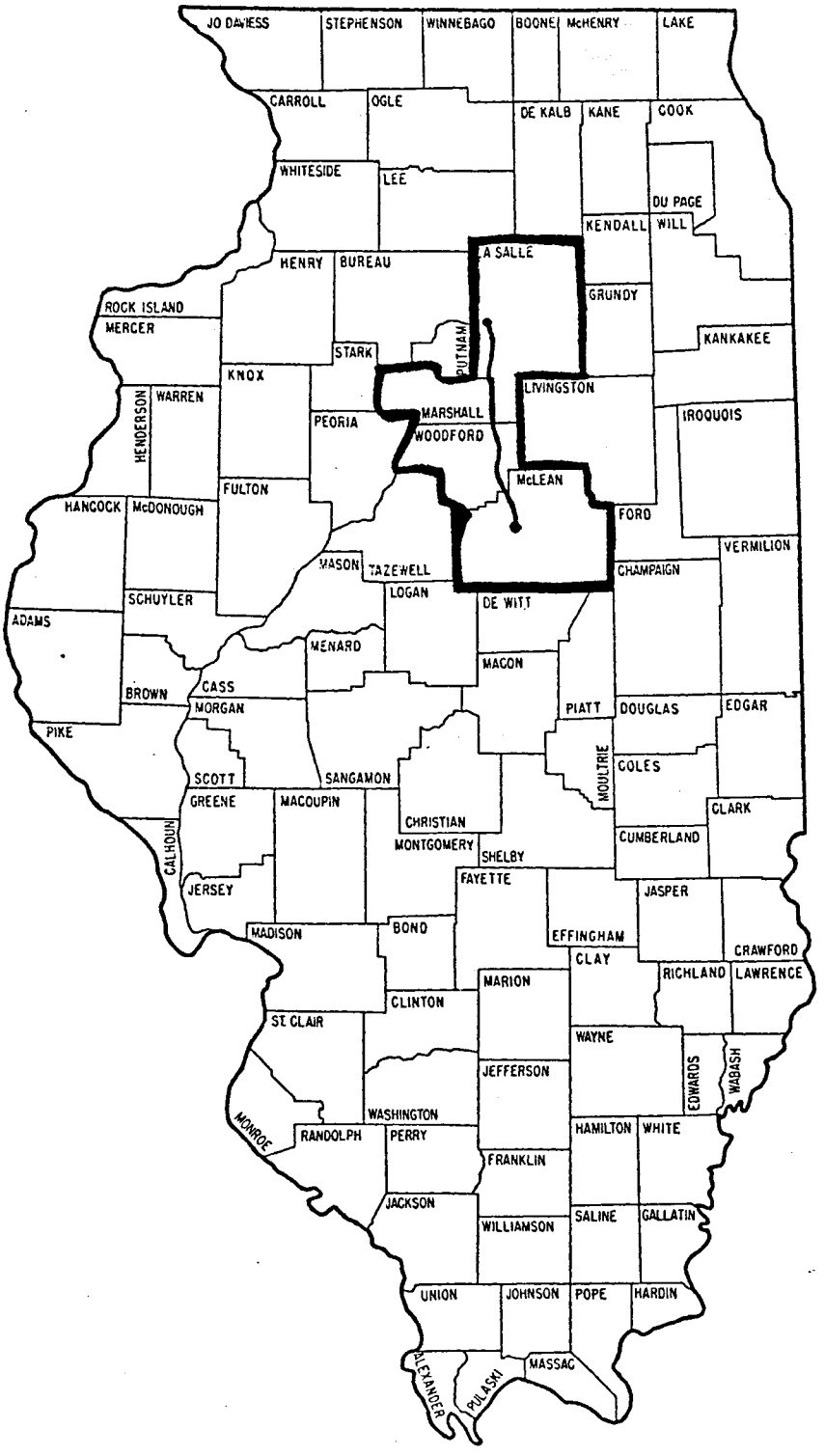

Figure 1. Location of FAP 412, U. S. Route 51, project area, extending 63 miles from Bloomington north to Oglesby, Illinois, LaSalle, Marshall, McLean, and Woodford counties. Birds were surveyed during October, 1984, and January, March, April, May, and June 1985.

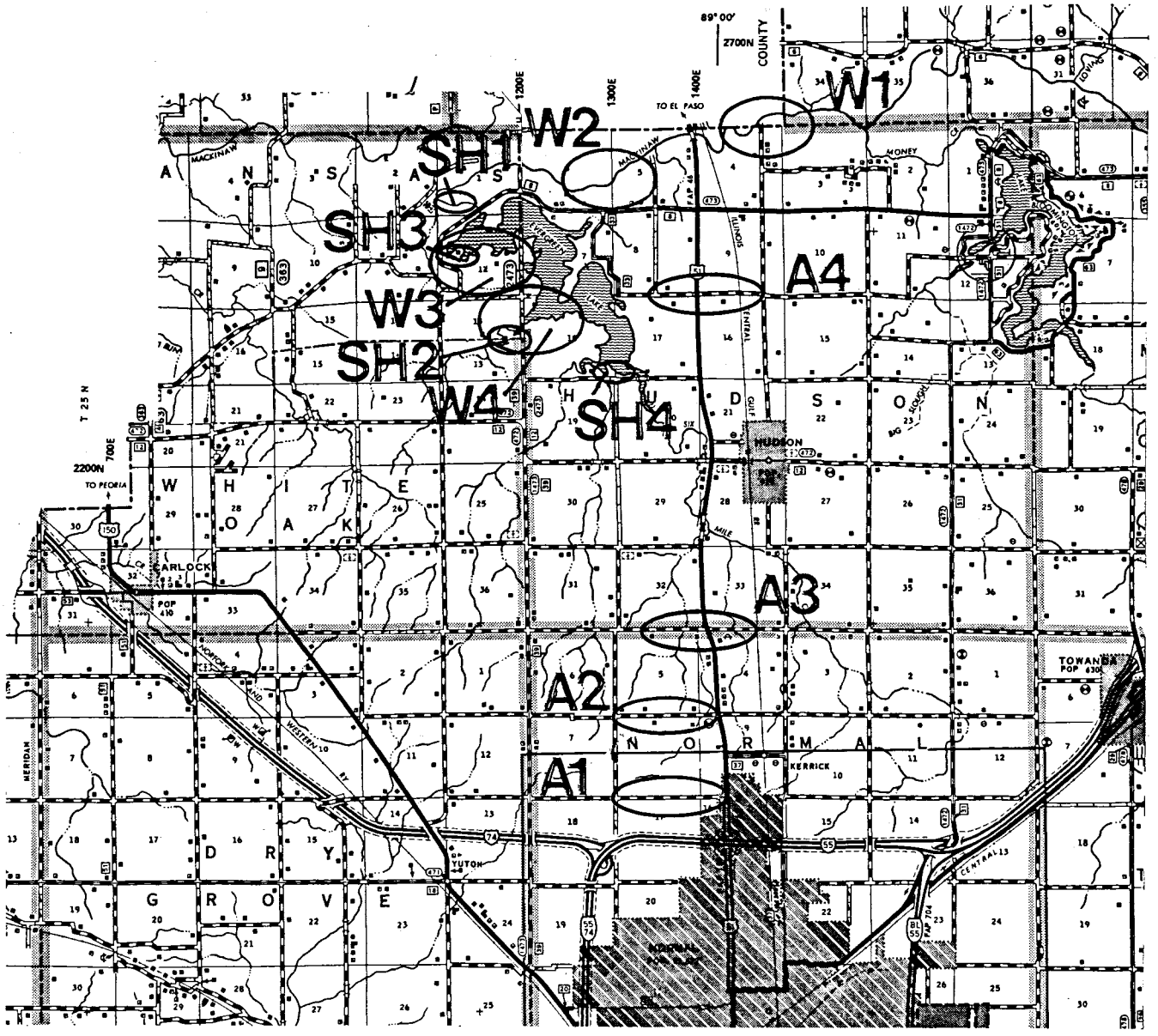

Figure 2. Location of FAP 412 bird transects in McLean and Woodford counties, Illinois: Agricultural (A1 through A4); Woodland (W1 through W4); and Special Habitat (SH1 through SH4). Transects were monitored during October and November 1984, and January, April, May, June, and July 1985. (Taken from Illinois Department of Transportation county highway maps, 1982 eds.).

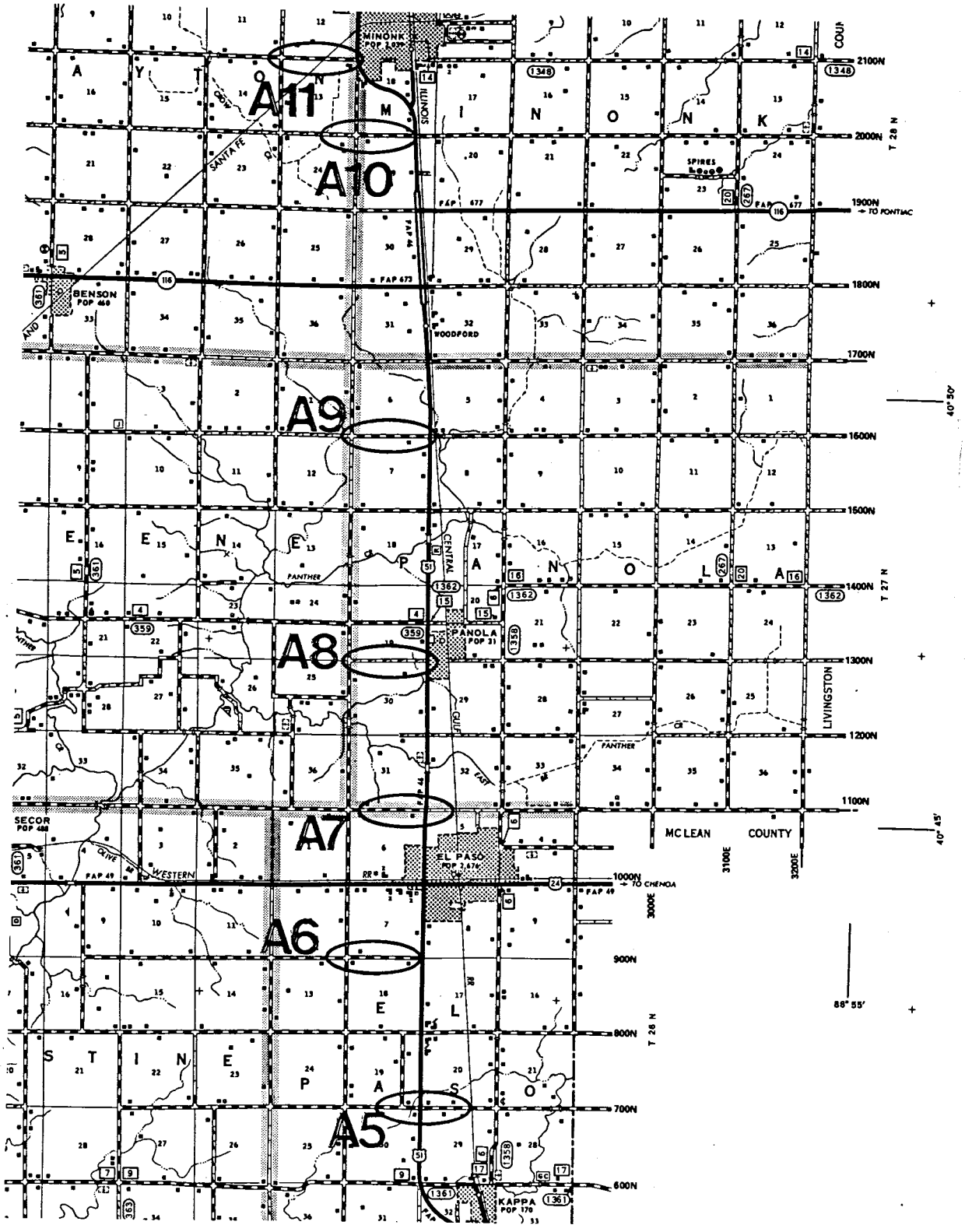

Figure 3. Location of FAP 412 bird transects in Woodford County, Illinois: Agricultural (A5 through A11). Transects were monitored during October and November 1984, and January, April, May, June, and July 1985. (Taken from Illinois Department of Transportation county highway maps, 1982 ed.).

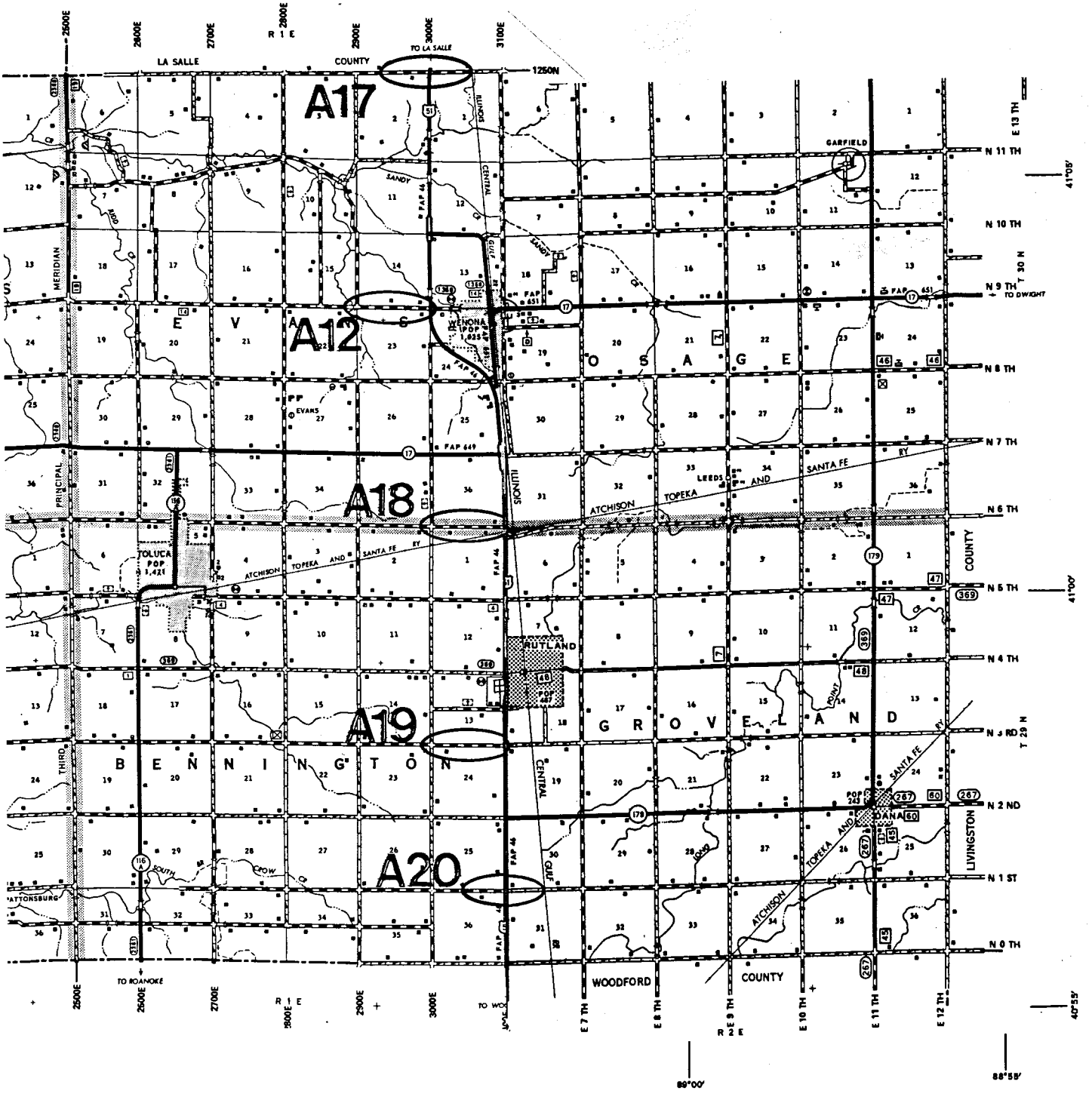

Figure 4. Location of FAP 412 bird transects in LaSalle and Marshall counties, Illinois: Agricultural (A12, and A17 through A20). Transects were monitored during October and November 1984, and January, April, May, June, and July 1985. (Taken from Illinois Department of Transportation county highway maps, 1982 eds.).

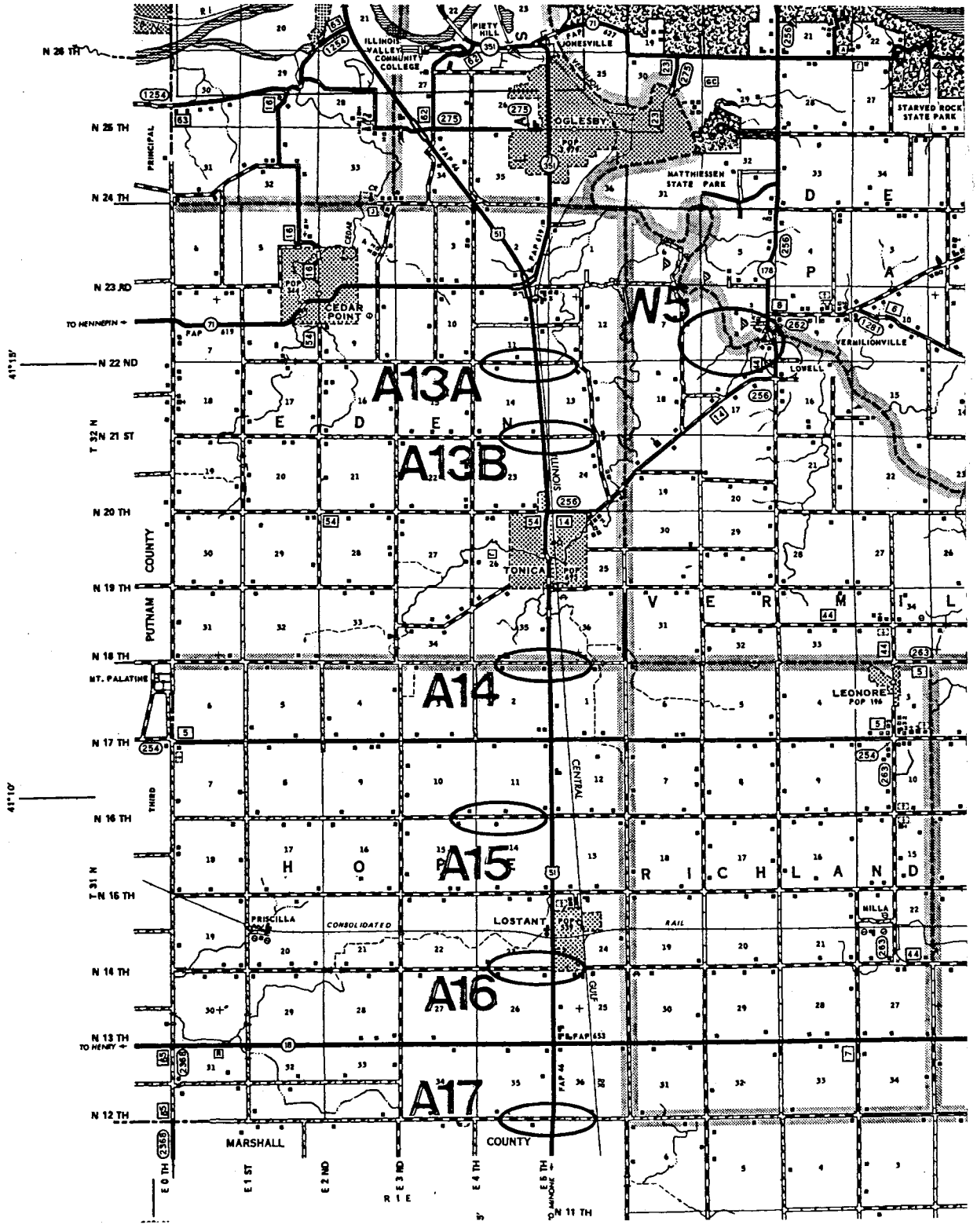

Figure 5. Location of FAP 412 bird transects in Lasalle County, Illinois: Agricultural (A13A, A13B, and A14 through A17); and Woodland (W5). Transects were monitored during October and November 1984, and January, April, May, June, and July 1985. (Taken from Illinois Department of Transportation county highway maps, 1982 eds.).

LEGAL LOCATIONS AND HABITAT DESCRIPTION

WOODLAND CENSUS TRANSECTS

TRANSECT W1

Legal location - (Figure 2, 6)

IL, Woodford & McLean cos.,12 km SW Gridley (1.9 km SE Kappa). Bird census transect 1.61 km in length. T.25N, R.2E, N/4, sec. 4, and T.26N, R.2E, S/2, SE/2, Sec. 33, and SW/4, SW/4, Sec. 34. U.T.M.: $^{45}_{03}{}^{350m}_{N}$, $^{3}_{31}{}^{750m}_{E}$, Zone 16 (center of transect). elev.: 201 m. Gridley, Ill. (7.5' series, 1981 ed.) USGS topographic quadrangle.

Habitat description -

This transect primarily passes through a narrow strip of young to mature flodplain forest, mainly 30-to 90-years old, on the south bank of the Mackinaw River. *Acer saccharinum* (silver maple), is the dominant canopy tree, with *Celtis occidentalis* (hackberry), *Fraxinus pennsylvanica* (green ash), *Juglans nigra* (black walnut), *Platanus occidentalis* (sycamore), *Populus deltoides* (cottonwood), and *Quercus macrocarpa* (burr oak), as occasional canopy trees. Occasioanl large trees, ranging from 29 to 37 inches dbh, are present. The subcanopy is diverse, with common *Acer negundo* (box elder), *Acer saccharinum*, and *Morus rubra* (red mulberry), and occasional *Carya cordiformis* (bitternut hickory), *Carya ovata* (shagbark hickory), *Fraxinus pennsylvanica*, *Macleera pomifera* (osage orange), *Morus alba* (white mulberry), *Prunus serotina* (wild black cherry), *Ulmus americana* (American elm), and *Ulmus rubra* (slippery elm). Predominant shrubs and vines include: *Rhus radicans* (poison ivy), *Sambucus canadensis* (elderberry), *Smilax rotundifolia* (catbrier), and *Vitis* sp. (grape). The lush, dense groundcover is dominated by *Boehmeria cylindrica* (false nettle), *Laportea canadensis* (wood nettle), *Philaris arundinacea* (reed canary grass), and *Rudbeckia lacinata* (goldenglow).

The west part of the transect diverges south from the river bank and passes through a regrowth to young (10 to 30 years old) woodlot dominated by *Acer negundo*, *Juglans nigra*, *Macleera pomifera*, *Prunus serotina*, *Rhus glabra*, and *Ulmus rubra*.

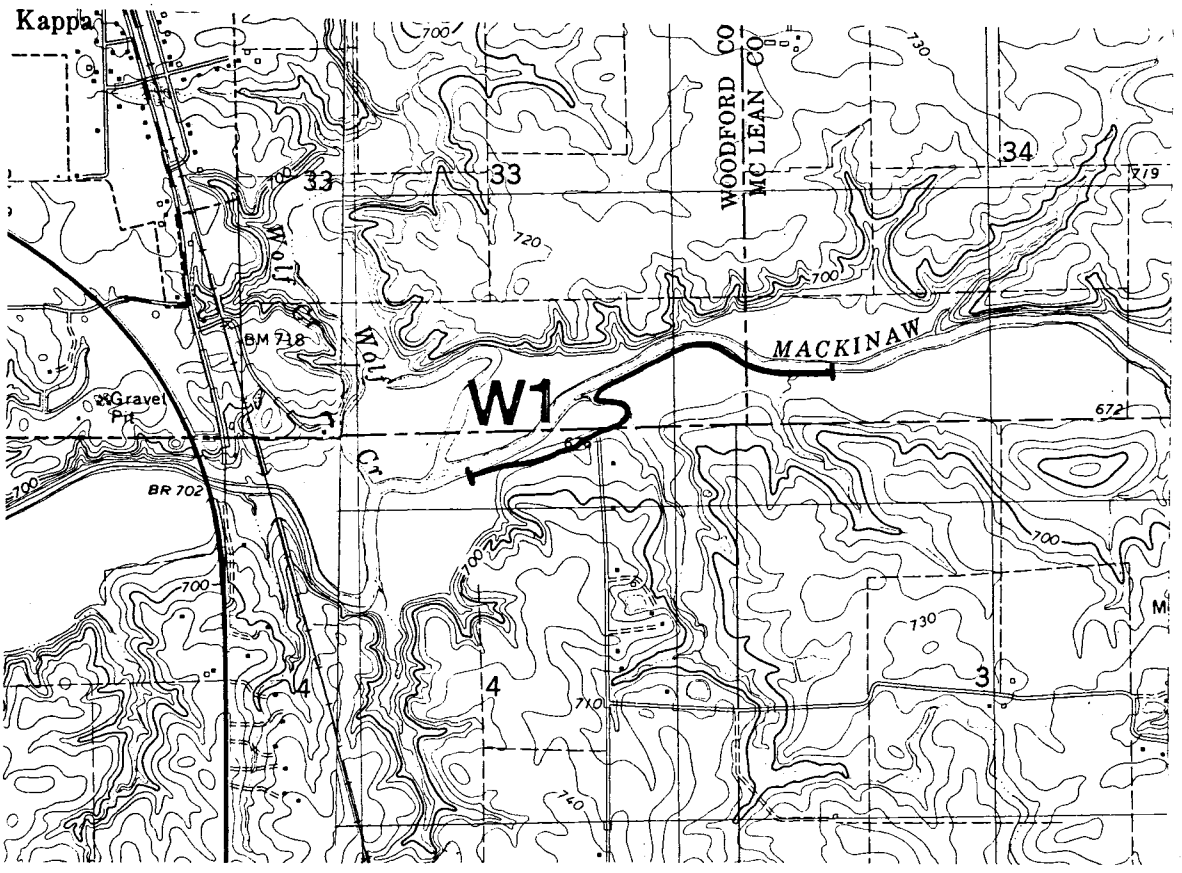

Figure 6. Location of FAP 412 Woodland Transect W1, 12 km SW Gridley (1.9 km SE Kappa) Woodford & McLean counties, Illinois, surveyed for birds during 1984 and 1985 (enlarged from Gridley, Ill. (7.5' series, 1981 ed.) USGS topographic quadrangle map).

TRANSECT W2A

Legal location - (Figure 2, 7)

IL, McLean Co., 1.5 km SW Kappa. Bird census transect 1.61 km in length. T.25N, R.2E, W/2, Sec. 5. U.T.M.: $4502650m$ N, $329150m$ E, Zone 16 (center of transect). elev.: 201 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

Habitat description -

The transect begins on the south bank of the Mackinaw River in a young, wet-mesic floodplain forest strip. This riparian strip is dominated by 40-to 50-year old *Acer saccharinum* with *Ulmus rubra* as the subcanopy. The transect crosses the river to the north bank which is also dominated by *Acer saccharinum*. Very large *Populus deltoides* (120 to 150 cm dbh) joins *Acer saccharium* as an occasional canopy species. The subcanopy here is more diverse and includes *Fraxinus pennsylvanica*, *Celtis occidentalis*, and *Acer negundo* as well as *Ulmus rubra*.

The transect continues westerly away from the river along the margins of a cultivated floodplain up to 200 m north of the river bank before returning in a southwesterly direction crossing to the south river bank where the transect terminates. As the transect passes westerly from the north river bank it follows a wooded fence row which divides the cropland to the south from a grazed shrubland to the north. The wooded fence row includes *Maclura pomifera*, *Acer saccharinum*, *Gleditsia triacanthos* (honey locust), *Morus rubra*, and *Crataegus* sp. (hawthorn). With the exception of *Acer saccharinum*, these species make up the adjacent grazed shrubland. The cultivated floodplain meets a south facing slope about 200 m north of the river. The transect passes southwesterly along the slope base between a narrow floodplain forest strip and a terrace which grades upslope into a grazed dry-mesic upland forest. Species common along the river bank occur in the narrow floodplain forest strip while mesic upland forest species occur on the narrow terrace and lower slope. Here, *Quercus macrocarpa*, *Q. bicolor* (swamp white oak), and *Platanus occidentalis* dominate the canopy and merge upslope with a grazed upland forest dominated by *Quercus rubra* (northern red oak) and *Q. alba* (white oak). Common to occasional subcanopy species include *Acer negundo* and *Ulmus rubra* on the lower slope and *Juglans nigra*, *Morus rubra*, *Staphlea trifolia* (bladdernut), *Cercis canadensis* (redbud), and *Crataegus* sp. on the mid to upper slope.

As the transect again crosses the river, *Populus deltoides* becomes codominant with *Acer saccharinum* in the canopy and a subcanopy similar to that found at the transect origin. The herbaceous understory in the floodplain region is composed of dense *Laportea canadensis*, *Rudbeckia laciniata*, and *Boehmaria cylindrica* A golf course borders the floodplain forest strip on the south river bank.

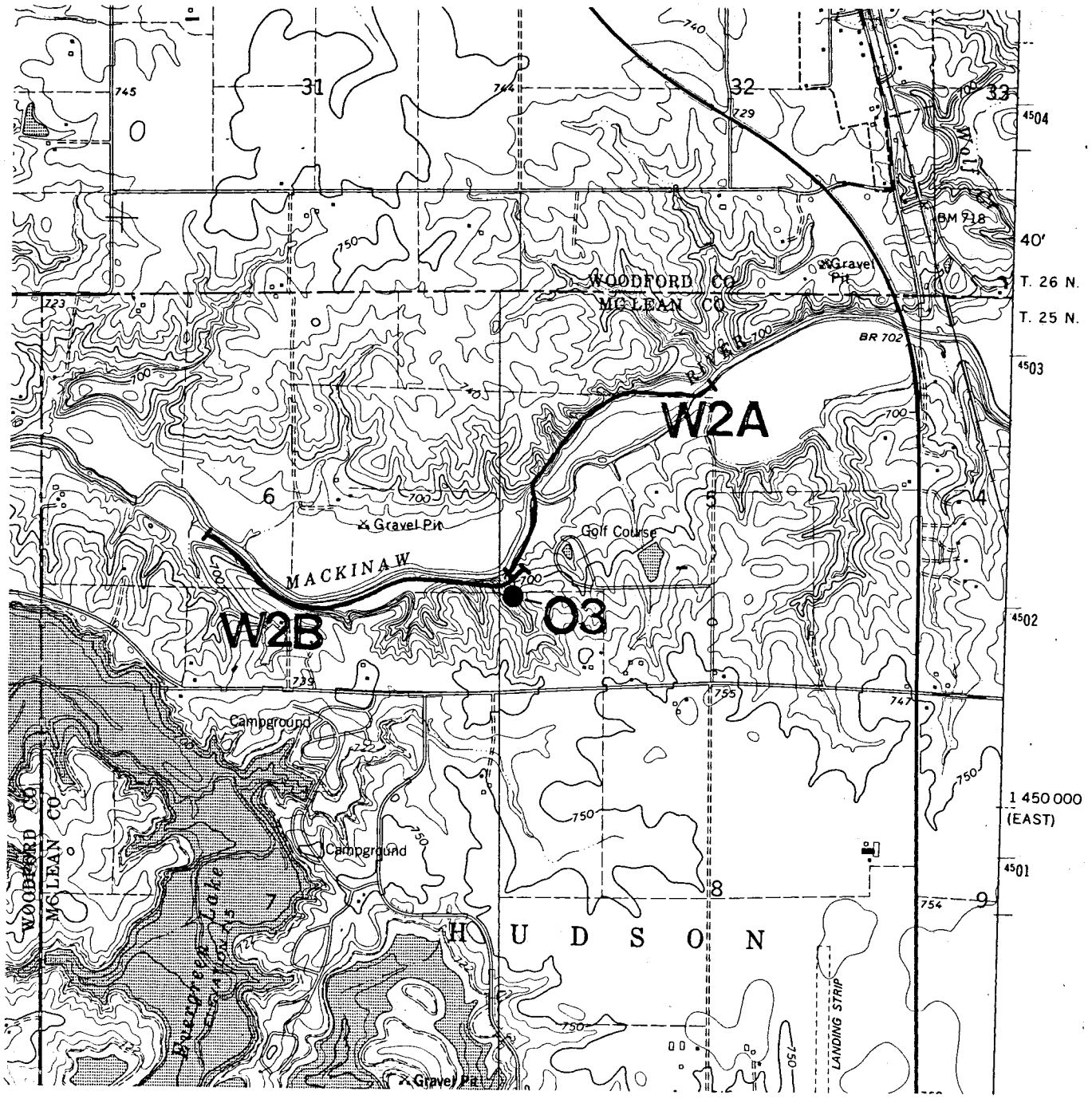

Figure 7. Location of FAP 412 Woodland Transect W2A, 1.5 km SW Kappa; Woodland Transect W2B, 2.8 km SW Kappa; and owl sampling point 03, 1.0 km SW Kappa, McLean County, Illinois, surveyed for birds during 1984 and 1985 (enlarged from El Paso, Ill. (7.5'series, 1970 ed., 1979 PR.) USGS topographic quadrangle map).

TRANSECT W2B

Legal location - (Figure 2, 7)

IL, McLean Co., 2.8 km SW Kappa. Bird census transect 1.61 km in length. T.25N, R.2E, SE/4 Sec. 6 and SW/4, SW/4 Sec. 5. U.T.M.: $^{45}02^{040m}$ N, $^{3}28^{630m}$ E, Zone 16 (center of transect). elev.: 213.4 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

Habitat description -

This woodland transect passes through two types of forest. Floodplain forest (or forested palustrine wetland) occurs on the floodplain of the Mackinaw River, and mesic upland forest occurs on the slopes.

The floodplain forest is composed of mature second growth trees with occasional old trees. *Acer saccharinum* and *Populus deltoides* are dominant canopy trees, while *Platanus occidentalis*, *Celtis occidentalis*, *Juglans nigra*, *Morus rubra*, and *Quercus bicolor* are occasional canopy species. *Acer negundo* is common in the subcanopy and *Euonymus atropurpurea* (wahoo), *Celtis occidentalis*, and *Ulmus rubra* are occasional in the subcanopy. Large colonies of *Toxicodendron radicans* are locally common. The dense groundcover is dominated by *Laportia canadensis*, with common *Rudbeckia laciniata*, *Boehmeria cylindrica* and *Impatiens* sp. (touch-me-not).

The mature second-growth mesic forest on the slopes is dominated by *Tilia americana* (basswood), *Quercus rubra*, and *Carya ovata*, with occasional *Quercus alba*. Common trees in the dense subcanopy are *Acer saccharum* (sugar maple), *Ostrya virginiana* (hop hornbeam), and *Quercus rubra*, while *Celtis occidentalis*, *Carpinus caroliniana* (blue beech), *Staphylea trifolia*, and *Viburnum prunifolium* (black haw) are occasional. *Asarum canadensis* (wild ginger), *Aquilegia canadensis* (columbine), *Podophyllum peltatum* (mayapple), and *Uvularia grandiflora* (yellow bellwort) are among the many wildflowers present.

TRANSECT W3

Legal location - (Figure 2, 8)

IL, Woodford & McLean cos., 5.5 km SW Kappa. Bird census transect 1.61 km in length. T.25N, R.2E, SE/4, NE/4, Sec. 13, and T.25N, R.2E, W/4, NW/4, Sec. 18. U.T.M.: $^{45}99^{450m}$ N, $^{3}27^{000m}$ E, Zone 16 (center of loop transect). elev.: 220 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

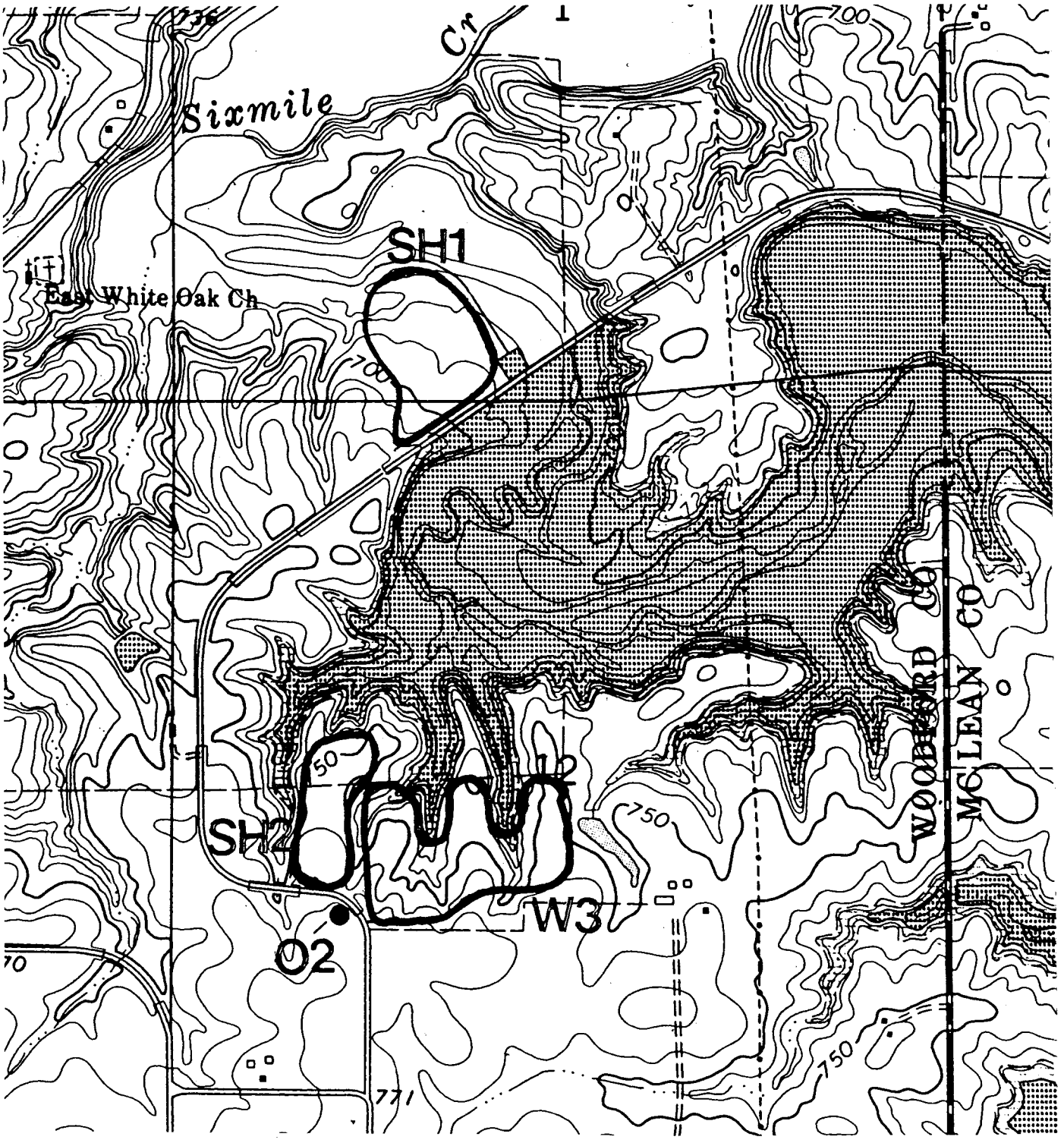

Figure 8. Location of FAP 412 Woodland Transect W3, 5.5 km SW Kappa, Woodford & McLean counties; Special Habitat SH1, a late successional field 5 km WSW Kappa; Special Habitat SH2, an early successional field and edge habitat 6.2 km SW Kappa; and owl sampling point O1, 6.0 km SW Kappa, Woodford County, Illinois, surveyed for birds during 1984 and 1985 (enlarged from El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle map).

TRANSECT W3 (continued)

Habitat description -

This dry-mesic upland forest is composed of young to mature second growth trees that are mainly 20 to 70 years old. Portions of the woodlot are mature, while other parts consist entirely of young trees. The numerous stumps scattered throughout the area indicate past logging. *Quercus alba* and *Quercus rubra* are the dominant canopy trees. Common subcanopy trees are *Acer saccharinum*, *Carya ovata*, *Fraxinus americana* (white ash), *Prunus serotina*, and *Ulmus rubra*, while occasional subcanopy species are *Celtis occidentalis*, *Corylus americana* (hazelnut), *Crategus* sp., *Ostrya virginianus*, *Prunus virginiana* (common chokecherry), *Staphylea trifolia*, and *Viburnum prunifolium*. Common shrubs and vines are *Ribes missouriensis* (Missouri gooseberry), and *Parthenocissus quinquefolia* (Virginia creeper).

TRANSECT W4

Legal location - (Figure 2, 9)

IL, Woodford Co., 5.4 km SW Kappa. Bird census transect 1.61 km in length. T.25N, R.1E, NE/4, SW/4, Sec. 12. U.T.M.: $45_{00}650m$ N, $3_{26}110m$ E, Zone 16 (center of transect). elev.: 225 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

Habitat description -

The western half of this transect passes through woodlots, some of which are heavily grazed, patchy old fields in various successional stages adjacent to disturbed woodlots, and non-native grassland. As the transect passes through forest, the composition, community structure, and degree of grazing varied. The transect begins in a heavily grazed woodlot with scattered old trees including *Quercus macrocarpa*, *Quercus rubra* (red oak), and *Tilia americana*. The transect passes in a westerly direction beneath a powerline and crosses an intermittent stream. Here, a young woodland adjoins a successional shrubland. *Juglans nigra* is locally abundant while *Maclura pomifera* and *Gleditsia triacanthos* are common to abundant throughout the transect west of the county line. *Prunus serotina*, *Morus alba*, *Crataegus* sp., and *Ulmus rubra* make up the common understory species. *Rubus* sp. (blackberry), *Rosa multiflora* (multiflora rose), and *Ribes missouriense* (gooseberry) are common throughout the shrubland together with disturbance-adapted forbs and cool-season introduced grasses.

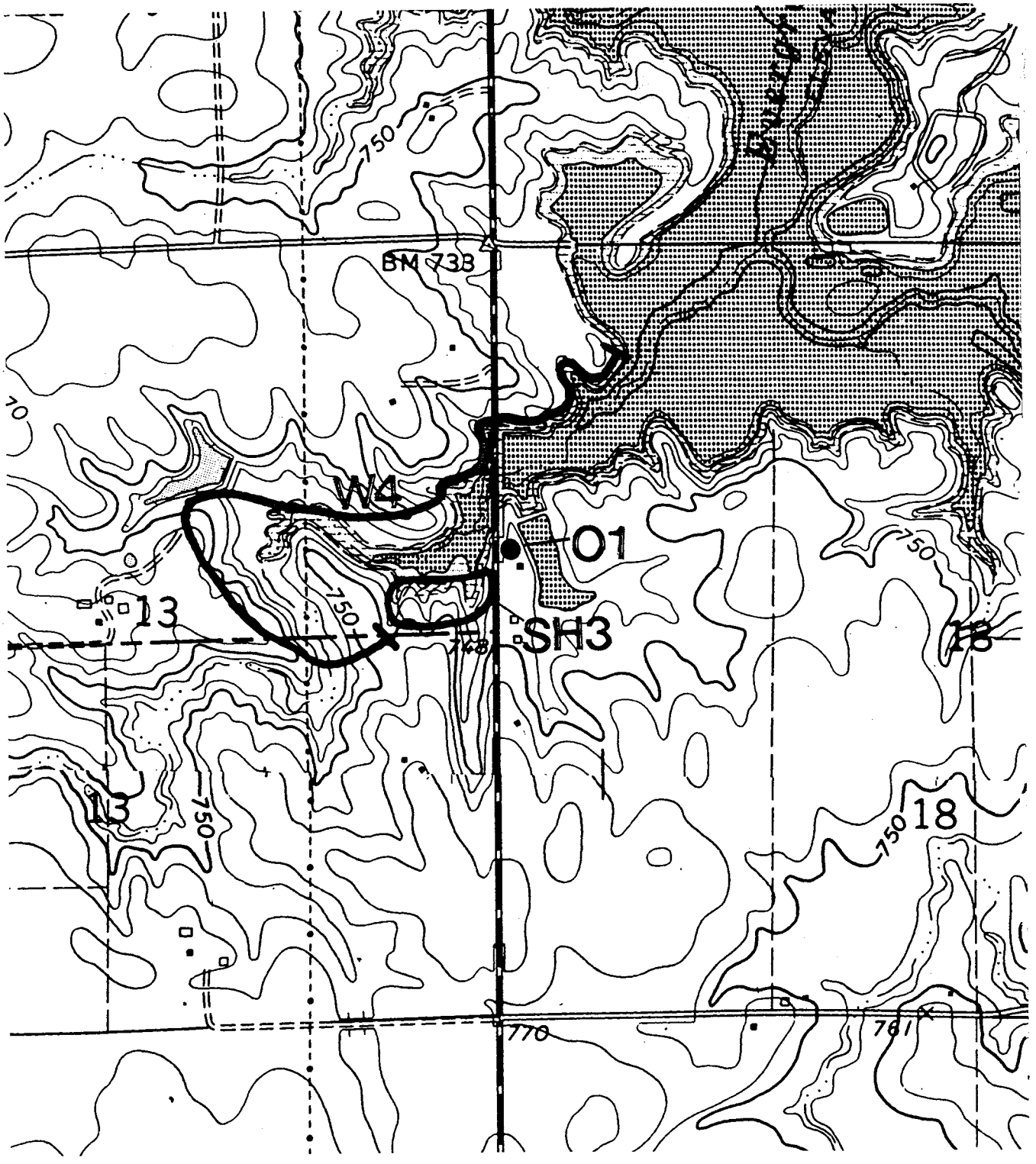

Figure 9. Location of FAP 412 Woodland Transect W4, 5.4 km SW Kappa; Special Habitat SH3, an emergent palustrine wetland 5.7 SW Kappa; and owl sampling point 1, 5.9 km SW Kappa, Woodford County, Illinois, surveyed for birds during 1984 and 1985 (enlarged from El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle map).

TRANSECT W4 (continued)

The transect then passes near an open oak-hickory woodlot at a private residence, through more shrubland bordering a woodlot dominated by young and beneath the powerline again where non-native grassland composed of *Bromus inermis* (awnless brome grass) dominates the slope to near the county line. Here, the transect again passes through a young woodlot dominated by young honey locust.

Crossing the county-line road, the transect enters a lakeside mature second-growth dry-mesic upland forest strongly dominated by *Quercus alba*, with occasional *Quercus macrocarpa* and *Carya ovata*. A dense understory includes *Juglans nigra*, *Acer negundo*, *Fraxinus americana*, *Crataegus* sp., *Quercus imbricaria* (shingle oak), *Maclura pomifera*, *Prunus americana*, *Rhus glabra*, and *Amorpha fruticosa* (false indigo). The transect ends in this woodland at the lake edge.

TRANSECT W5

Legal location - (Figure 5, 10)

IL, LaSalle Co., 4.2 km SSW Ogelsby. Bird census transect 1.61 km in length. T.32N, R.2E, E/4, E/2, Sec. 7; and W/2, NW/4, Sec. 8. U.T.M.: $^{45}69^{450m}$ N, $^{3}30^{000m}$ E, Zone 16 (center of loop transect). elev.: 174 m. LaSalle, Ill. (7.5' series, 1966 ed., 1979 PR.).

Habitat description -

This transect begins at the head of a narrow forested ravine cut through a broad, flat, cultivated ridge top; follows a dirt road down the hollow; passes east along the slope base and; terminates on the floodplain at the edge of the Vermilion River.

The narrow forest at the ravine head is dominated by *Quercus macrocarpa* with a subcanopy of *Ulmus rubra* and *Fraxinus americana*. This community rapidly grades into a broader forest dominated by young to mature *Quercus rubra*, *Q. alba*, and *Tilia americana*, all with numerous multiple-stemmed trees. Towards the ravine base, the forest community improves in structure, is older, and is composed of mesic to dry-mesic upland forest species. This old, second-growth forest is partially in the Margery C. Carlson Nature Preserve and has canopy dominants including *Acer saccharum*, *Carya ovata*, *Quercus rubra*, *Q. alba*, *Fraxinus americana*, and *Tilia americana*. The subcanopy is diverse and includes *Juglans cinerea* (butternut), *Carpinus caroliniana*, *Ostrya virginiana*, *Cercis canadensis*, *Hamamalis virginiana* (witch hazel), *Acer saccharum*, *Ulmus rubra*, and *Hydrangea arborea* (wild hydrangea).

TRANSECT W5 (continued)

The transect passes southeasterly at the base of a slope along a broad terrace. Here, *Populus grandidentata* (big-tooth aspen) becomes dominant in the canopy including *Quercus rubra, Q. alba, Tilia americana,* and *Acer saccharum.* Near the transect the terrace includes old field successional areas dominated by disturbance-adapted forbs and shrubs together with thickets of *Salix interior* and *Populus deltoides* saplings. Where the slope base merges with the west river bank, the transect turns north along the river bank. Young to mature *Acer saccharinum* dominate the narrow floodplain canopy with *Populus deltoides.* On slightly elevated positions adjacent to the transect, *Tilia americana, Acer saccharum, Juglans nigra,* and *Ulmus rubra* form the canopy and subcanopy.

Numerous lady's slipper orchids (*Cypripedium calceolus* var. *pubescens*) occur along the transect in the mesic riverside terrace. The transect terminates in a narrow floodplain forest on the west river bank.

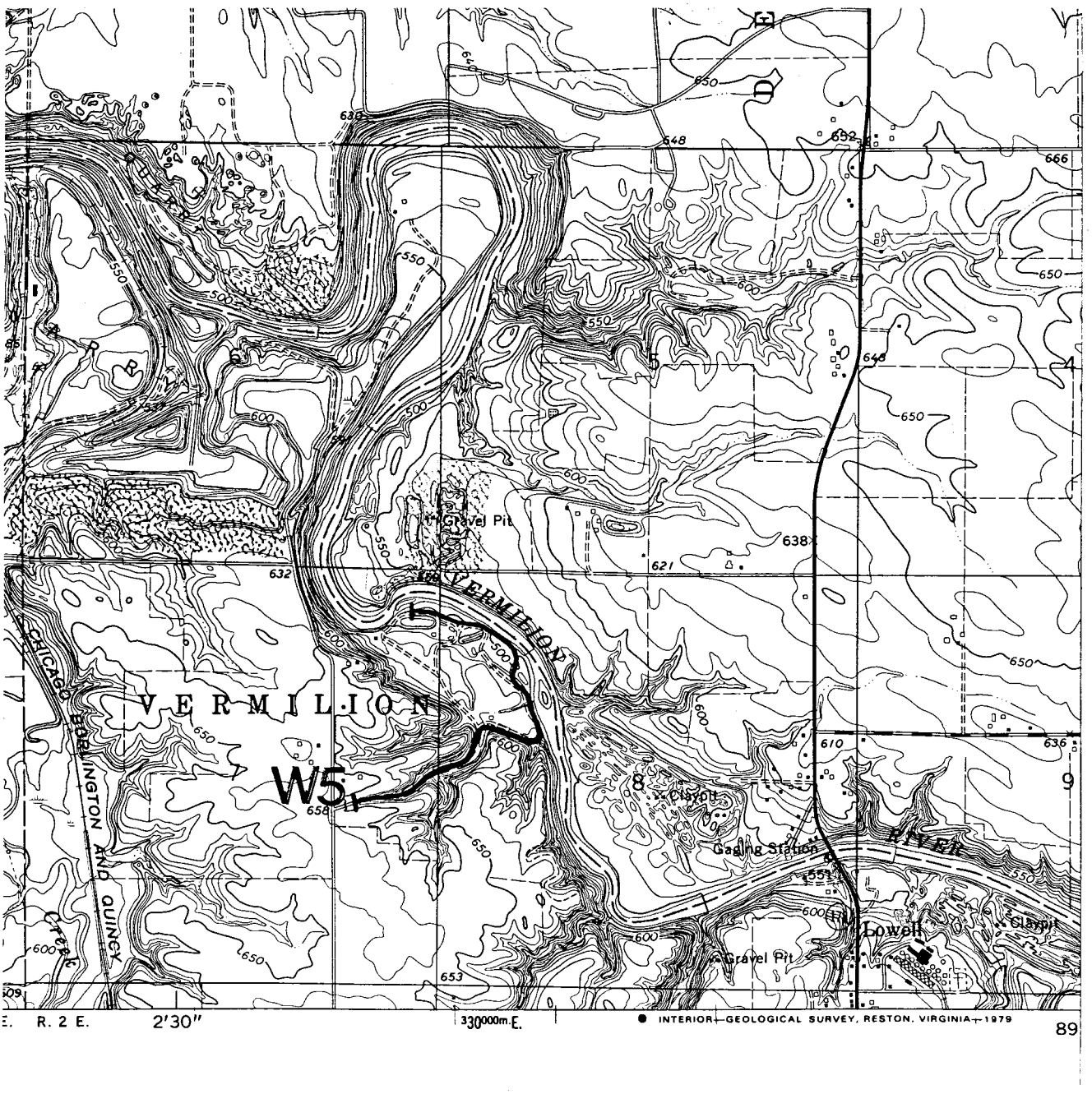

Figure 10. Location of FAP 412 Woodland Transect W5, 4.2 km SSW Ogelsby, LaSalle, surveyed for birds during 1984 and 1985 (enlarged from LaSalle, Ill. (7.5' series, 1966 ed., 1979 PR.) USGS topographic quadrangle map).

AGRICULTURAL CENSUS TRANSECTS (Figures 2 through 5)

Habitat description -

A narrow strip of grassland dominated by introduced cool-season grasses, including *Festuca pratensis* (meadow fescue), *Bromus enermis* (smooth brome), *Poa pratensis* (Kentucky bluegrass), and *Dactylus glomerata* (orchard grass), adjoins both roadsides. Disturbance-adapted forbs, such as *Melilotus officianale* (yellow sweet clover), *Trifolium pratense* (red clover), *Tragopogon dubius* (sand goat's-beard), and *Rumex crispus* (curly dock), are occasional to common in the grasslands. Extensive cropland occurs beyond the narrow grasslands.

Legal locations -

TRANSECT A1 (Figure 2)

IL, McLean Co., 4.5 km N Normal. T.24N, R.2E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 8 and 17. U.T.M.: $^{44}90^{140m}$ N, 3_{29}^{520M} E, Zone 16 (center of transect). elev.: 265 m. Normal West, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

TRANSECT A2 (Figure 2)

IL, McLean Co., 5.2 km N Normal. T.24N, R2E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 4 & 5, and Sec. 8 & 9. U.T.M.: $^{44}91^{760m}$ N, 3_{28}^{780m} E, Zone 16 (center of transect). elev.: 256 m. Normal West, Ill. (7.5' series, 1970 ed., 1979 PR.), and Normal East, Ill. (7.5' series, 1981 ed.) USGS topographic quadrangle.

TRANSECT A3 (Figure 2)

IL, McLean Co., 2.7 km SSW Hudson. Bird census transect 1.61 km in length along co. Sec. rd. between T.25N and T.24N, R.2E, and between Sec. 32 and 5. U.T.M.: $^{4493}420m$ N, 3_{30}^{760m} E, Zone 16 (center of transect). elev.: 245 m. Normal West, Ill. (7.5' series, 1970 ed., 1979 PR.), and Normal East, Ill. (7.5' series, 1981 ed.) USGS topographic quadrangle.

TRANSECT A4 (Figure 2)

IL, McLean Co., 4.4 km S Kappa. T.25N, R.2E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 8 & 9, and Sec. 16 & 17. U.T.M.: $^{44}00^{000m}$ N, 3_{30}^{540m} E, Zone 16 (center of transect). elev.: 232 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

TRANSECT A5 (Figure 3)

IL. Woodford Co., 2.1 km N Kappa. T.26N, R.2E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 19 & 20, and Sec. 29 & 30. U.T.M.: $^{45}06^{490m}$ N, 3_{29}^{040m} E, Zone 16 (center of transect). elev.: 223 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

TRANSECT A6 (Figure 3)

IL, Woodford Co., 2.6 km SSW El Paso. T.26N, R.2E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 7 and 18. U.T.M.: $^{45}09^{720m}$ N, 3_{28}^{050m} E, Zone 16 (center of transect). elev.: 223 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

TRANSECT A7 (Figure 3)

IL, Woodford Co., 3.6 km SSW Panola. Bird census transect 1.61 km in length along co. Sec. rd. between Sec. 31 & 32, and Sec. 6 & 5. U.T.M.: $^{45}13^{000m}$ N, 3_{29}^{000m} E, Zone 16 (center of transect). elev.: 223 m. Benson, Illinois (7.5' series, 1983 provisional ed.) USGS topographic quadrangle.

TRANSECT A8 (Figure 3)

IL, Woodford Co., 1.0 km SW Panola. T.27N, R.2E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 19 and 30. U.T.M.: $^{45}16^{150m}$ N, 3_{28}^{290m} E, Zone 16 (center of transect). elev.: 215 m. Benson, Illinois (7.5' series, 1983 provisional ed.) USGS topographic quadrangle.

TRANSECT A9 (Figure 3)

IL, Woodford Co., 2.6 km SSW Woodford. T.27N, R.2E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 6 and 7. U.T.M.: $^{45}21^{000m}$ N, 3_{28}^{290m} E, Zone 16 (center of transect). elev.: 215 m. Benson, Illinois (7.5' series, 1983 provisional ed.) USGS topographic quadrangle.

TRANSECT A10 (Figure 3)

IL, Marshall and LaSalle cos., 2.4 km SSW Minonk. T.28N, R.1E, bird census transect 1.61 km in length along co. Sec. rd. between E/2, E/2, Sec. 13 & 14, and continuing into T.28N, R.2E, along co. Sec. rd. between Sec. 18 & 19. U.T.M.: $45_{27}480m$ N, $3_{28}000m$ E, Zone 16 (center of transect). elev.: 225 m. Minonk, Illinois (7.5' series, 1983 provisional ed.) USGS topographic quadrangle.

TRANSECT A11 (Figure 3)

IL, Marshall Co., 2.2 km WSW Minonk. T.28N, R.1E, Bird census transect 1.61 km in length : along co. Sec. rd. between Sec. 12 and 13. U.T.M. $45_{29}000m$ N, $3_{26}700m$ E, Zone 16 (center of transect). elev.: 228 m. Minonk, Illinois (7.5' series, 1983 provisional ed.) USGS topographic quadrangle.

TRANSECT A12 (Figure 4)

IL, Marshall Co., 1.7 km WNW Wenona. T.29N, R.1E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 14 and 23. elev.: 207 m. Wenona, Ill. (15' series, 1934 ed.) USGS topographic quadrangle. U.T.M. Coordinate Grid absent from 15' series.

TRANSECT A13A (Figure 5)

IL, LaSalle Co., 5.0 km S Ogelsby. T.32N, R.1E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 11 & 12, and 13 & 14. U.T.M.: $45_{68}290m$ N, $3_{26}700m$ E, Zone 16 (center of transect). elev.: 203 m. LaSalle, Ill. (7.5' series, 1966 ed., 1979 PR.) USGS topographic quadrangle.

TRANSECT A13B (Figure 5)

IL, LaSalle, Co., 1.61 km N Tonica. T.32N, R.1E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 13 & 14, and 23 & 24. U.T.M.: $45_{66}690m$ N, $3_{26}920m$ E, Zone 16 (Center of transect). elev.: 204.5m. Tonica, Ill. (7.5' series, 1983 provisional ed.) USGS topographic quadrangle.

TRANSECT A14 (Figure 5)

IL, LaSalle Co., 2.7 km S Tonica. Bird census transect 1.61 km in length along co. Sec. rd. between T.31N and T.32N, R.1E, between Sec. 35 & 36, and Sec. 1 & 2. U.T.M.: $45_{61}830m$ N, $3_{26}540m$ E, Zone 16 (center of transect). elev.: 208 m. Tonica, Illinois (7.5' series, provisional ed.) USGS topographic quadrangle.

TRANSECT A15 (Figure 5)

IL, LaSalle Co., 2.7 NNW Lostant. T.31N, R.1E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 11 and 14. U.T.M.: $45_{58}600m$ N, $3_{25}790m$ E, Zone 16 (center of transect). elev.: 218 m. Tonica, Illinois (7.5' series, 1983 provisional ed.) USGS topographic quadrangle.

TRANSECT A16 (Figure 5)

IL, LaSalle Co., 1.1 km SSW Lostant. T.31N, R.1E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 23 & 24, and Sec. 25 & 26. U.T.M.: $4555380m$ N, $3_{26}520m$ E, Zone 16 (center of transect). elev.: 207 m. Tonica, Illinois (7.5' series, 1983 provisional ed.) USGS topographic quadrangle.

TRANSECT A17 (Figure 5)

IL, Marshall and LaSalle cos., 5.8 km N Wenona. T.30N, R.1E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 35 & 36, and Sec. 1 & 2. elev.: 208 m. Wenona, Ill. (15' series, 1934 ed.) USGS topographic quadrangle. U.T.M. Coordinate Grid absent from 15' series.

TRANSECT A18 (Figure 4)

IL, Marshall Co., 4.6 km SSW Wenona. T.29N, R.1E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 1 and 36. elev.: 219 m. Wenona, Ill. (15' series, 1934 ed.) USGS topographic quadrangle. U.T.M. Coordinate Grid absent from 15' series.

TRANSECT A19 (Figure 4)

IL, Marshall Co., 2.1 km SW Rutland. T.29N, R.1E, bird census transect 1.61 km in length along co. Sec. rd. between Sec. 13 and 24. U.T.M.: $45_{37}200m$ N, $3_{26}680m$ E, Zone 16 (center of transect). elev.: 223 m. Minonk, Illinois (7.5' series, 1983 provisional ed.) USGS topographic quadrangle.

TRANSECT A20 (Figure 4)

IL, Marshall and LaSalle cos., 4.4 km NNW Minonk. T.29N, R.1E, bird census transect 1.61 km in length along co. Sec. rd. between E/2, Sec. 25 & 26, and continuing into T.29N, R.2E, between W/2, Sec. 30 & 31. U.T.M.: $^{45}34000m$ N, $^{3}27490m$ E, Zone 16 (center of transect). elev.: 225 m. Minonk, Illinois (7.5' series, 1983 provisional ed.) USGS topographic quadrangle.

SPECIAL HABITAT CENSUS TRANSECTS

TRANSECT SH1

Legal location - (Figure 2, 8)

IL, Woodford Co., 5 km WSW Kappa. T.25N, R.1E, SE/4, SW/4, Sec. 1. U.T.M.: $^{45}01700m$ N, $^{3}26020m$ E, Zone 16 (center of area). elev.: El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

Habitat description -

A shrubland consisting of dense young trees occurs on a gentle east-facing slope on the west margin of this area. *Acer negundo* saplings are very abundant, while *Juglans nigras*, *Prunus serotina*, and *Alnus* sp. (alder) are common. *Morus alba*, *Morus rubra*, *Rhus glabra* (smooth sumac), *Fraxinus americana*, and *Cornus drummondii* (rough-leaved dogwood) occur occasionally as saplings. One large mature black oak is present. The herbaceous groundcover is dominated by *Festuca pratensis* (meadow fescue), *Poa pratensis*, *Pastinaca sativa* (wild parsnip), and *Solidago artissima* (tall goldenrod).

An old field containing a mosaic of introduced cool-season grasses and disturbance-adapted forbs, both native and non-native, lies just east of the shrubland on a gently sloping terrace of Sixmile Creek. Dominant grasses are *Poa pratensis*, *Festuca pratensis*, *Bromus inermis* (smooth brome), while common or abundant forbs are *Aster pilosus* (hairy aster), *Asclepias syriaca* (common milkweed), *Achillea millefollium* (yarrow), *Rumex altissimus* (pale dock), and *Melilotus officinale* (yellow sweet clover). Scattered *Acer negundo* and *Populus deltoides* saplings are present.

TRANSECT SH2

Legal location - (Figure 2, 8)

Il, Woodford Co., 6.2 km SW Kappa. T.25N, R.1E, S/2, SE/4, NE/4, Sec. 13. U.T.M.: $4499300m$ N, $326900m$ E, Zone 16 (center of area). elev.: 223 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

Habitat description -

This open, grassy field is strongly dominated by *Dactylis glomerata* (orchard grass), with common *Bromus inermis* and *Poa pratensis*, and occasional *Festuca pratensis*. *Erigeron annus* (daisy fleabane) and *Solidago altissima* (tall goldenrod) are common forbs. The east, north, and west margins consist of young to mature upland forest dominated by *Quercus alba* and *Quercus rubra*. A road forms the south boundary.

TRANSECT SH3

Legal location - (Figure 2, 9)

IL, Woodford Co., 5.7 SW Kappa. T.25N, R.1E, SW/4, SW/4, NW/4, Sec. 12, and NE/4, NW/4, SW/4, Sec. 12. U.T.M.: $4500800m$ N, $325780m$ E, Zone 16 (center of area). elev.: 226 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

Habitat description -

An emergent palustrine wetland borders the south edge of Evergreen Lake and an unnamed stream flows into the lake. A dense stand of *Phalaris arundinacea* (reed canary grass) lines the lake margin. Just south of this, there occurs a broad expanse of *Leersia oryzoides* (rice cut grass) with scattered colonies of *Typha latifolia* (cat-tail). The southern-most edge of the wetland is floristically more diverse, containing *Asclepias incarnata* (swamp milkweed), *Carex hystricina* (sedge), *Carex stipata* (sedge), *Carex vulpinoidea* (sedge), *Eleocharis erythropoda* (spike rush), *Eupatorium perfoliatum* (common boneset), *Lycopus americanus* (common water horehound), *Pastinaca sativa*, *Poa pratensis*, and *Scirpus* sp. (bulrush).

A north-facing slope which adjoins the south border of the wetland was a grazed pasture at one time, but is now a shrubland dominated by shrubs and tree saplings. *Juglans nigra*, *Prunus americana*, *Crategus* sp., and *Rubus* sp. (blackberry) are common saplings and shrubs. The ground cover is dominated by *Bromus ineris*, with common to abundant *Poa pratensis* and *Solidago altissima*.

TRANSECT SH4

Legal location - (Figure 2, 11)

IL, McLean Co., 12.5 N Normal (5.9 SSW Kappa). T.25N, R.2E, E/4, SE/4, Sec. 18, and W/4, SW/4, Sec. 17. U.T.M.: $^{44}98^{500m}$ N, 3_{28}^{840m} E, Zone 16 (center of area). elev.: 229 m. Normal West, Ill. (7.5' series, 1970 ed., 1979 PR.), and El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

Habitat description -

This emergent palustrine wetland lies on the west floodplain of Sixmile Creek and is within the flood pool of Evergreen Lake. It is strongly dominated by *Phalaris arundinacea* with scattered clumps of *Typha latifolia* and *Carex* sp., including *Carex vulpinoidea* and *Carex stipata*. Common or occasional forbs are *Rumex altissimus*, *Eupatorium* sp. (boneset), *Asclepias syriaca*, *Pastinaca sativa*, and *Solidago* sp.. *Poa pratensis* is a common grass. Thickets of *Salix interior* (sandbar willow) and *Salix nigra* (black willow) occur on the west margin of this wetland, adjacent to a slope. Young, presumably planted, *Taxodium distichum* (bald cypress) are scattered along the west margin.

OWL SAMPLING POINTS (Figures 7 through 9)

SAMPLE POINT 01 (Figure 8)

IL, Woodford Co., 6.0 km SW Kappa. T.25N, R.1E, NW/4, NE/4, SW/4, Sec. 12. U.T.M.: $^{45}00^{590m}$ N, 3_{25}^{820m} E, Zone 16. elev.: 223 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

SAMPLE POINT 02 (Figure 9)

IL, McLean Co., 5.9 km SW Kappa. T.25N, R.1E, NW/4, SW/4, NW/4, Sec. 18. U.T.M.: $^{4499}420m$ N, 3_{27}^{100m} E, Zone 16. elev.: 223 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

SAMPLE POINT 03 (Figure 7)

IL, McLean Co., 1.0 km SW Kappa. Bird census transect 1.61 km in length. T.25N, R.2E, W/2, Sec. 5. U.T.M.: $^{45}02^{650m}$ N, 3_{29}^{150m} E, Zone 16 (center of transect). elev.: 201 m. El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle.

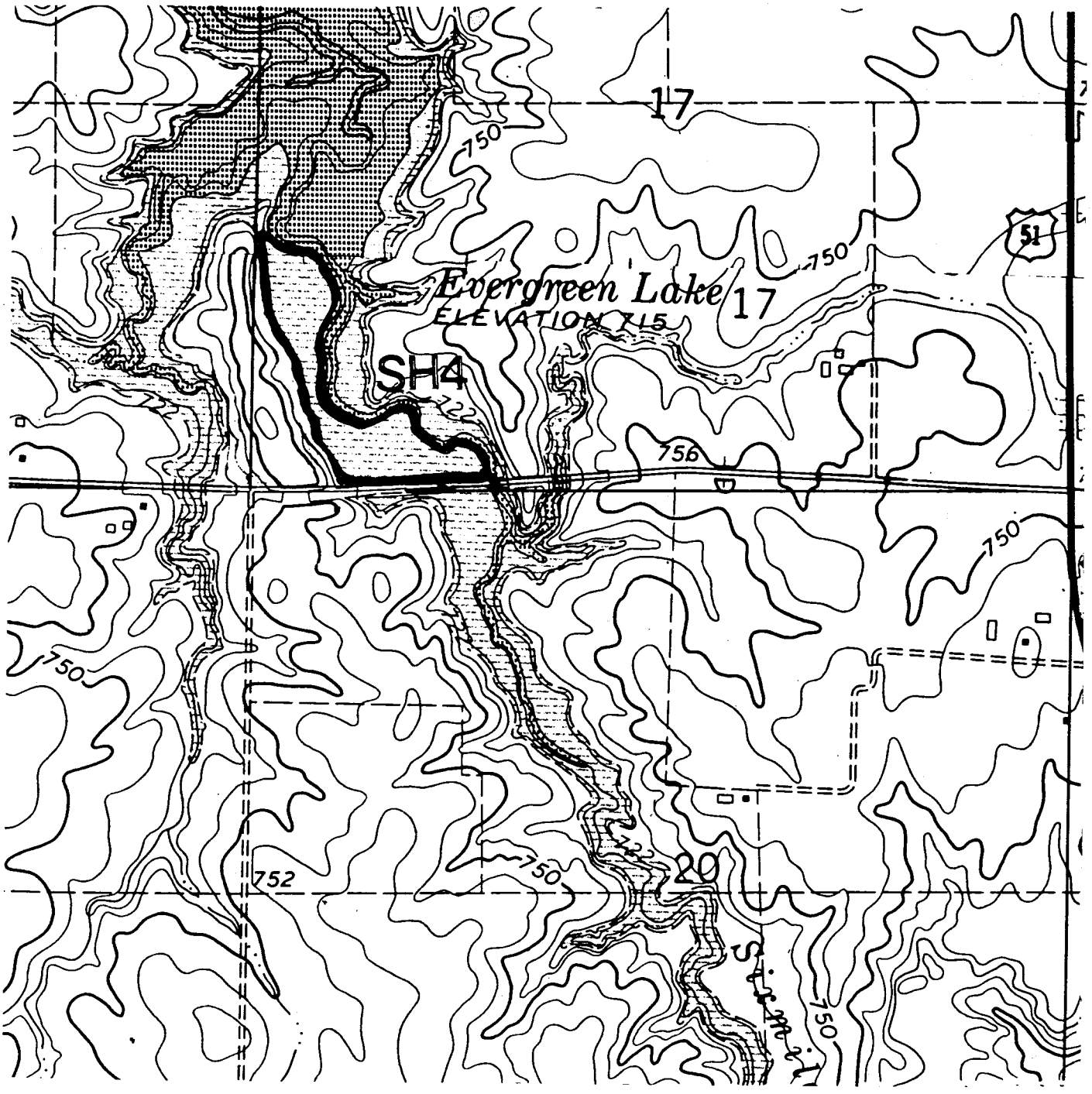

Figure 11. Location of FAP 412 Special Habitat SH4, an emergent palustrine wetland 12.5 km N Normal (5.9 km SSW Kappa), McLean County, Illinois, surveyed for birds during 1984 and 1985 (enlarged from Normal West, Ill. (7.5' series, 1970 ed., 1979 PR.) and El Paso, Ill. (7.5' series, 1970 ed., 1979 PR.) USGS topographic quadrangle maps).

METHODS

A 1 to 2 mile corridor surrounding the existing U. S. Route 51 alignment from Bloomington north to La Salle, Illinois, was characterized objectively and reliably using avian communities. All seasons were evaluated and special attention was given to endangered and threatened species. Surveys were completed for autumn, 1984, and the winter, spring, and breeding seasons of 1985. The survey procedures used were designed to generate quantitative data on bird abundance, breeding density, and habitats utilized within the project corridor.

Reconnaissance established the distribution and frequency of habitat types within the project area. Each defined habitat type was sampled with a different intensity depending on its extent. Homogeneous areas, at least with respect to main habitat features, were considered to be a 'habitat type'. These main features included the number of layers, percent cover, both horizontal and vertical structural diversities, vegetative form, and particular ecological features.

Two major habitat types occur within the project area: cultivated and woodland. Relative proportions of these two habitat types were determined through examination of aerial photographs, topographic maps and field observation. Cultivated areas predominated, forming approximately 80 percent of the FAP 412 project corridor; woodlands or wooded remnants constituted portions of the remainder.

Special habitats (*e.g.* wetlands, successional fields, and shrub-scrub areas) warranted attention, but could not be considered as major habitat types because of their scarcity. They have been recorded in "special counts" as described below.

A point-transect method was chosen as the most appropriate sampling technique for the autumn, winter, and spring censuses (Dawson 1981; Svenson 1981). The methodology consists of a fixed-length transect along which point-counts are performed at equal distances for a designated length of time (Blondel *et al.* 1981). This method provides reliable and comparable variables of abundance at the species level and the ability to census birds in patchy habitats.

The most practical transect length was determined to be 1 mile (1.6 km) because of the convenient grid pattern of the township road system. Similarly, ten stations were located 0.10 mile (528 ft or 161 m) apart along the transect line. On transects located in cultivated areas, the distance between stations was driven and measured on the vehicle odometer. Woodland transects were walked, with the distance paced by one individual at 260 paces between stations (premeasured to approximate 528 ft or 161 m). Because the wooded habitats were frequently patchy, these census routes were not straight line transects, therefore, the direction varied but never overlapped a previously censused area.

Data were collected at each fixed point or station. These stations were again located for subsequent censuses. Each point-count lasted 5 minutes. All birds seen or heard up to 100 feet (30.5 m) along the transect line in either direction of the station and an unlimited distance perpendicular to the

transect line were recorded. Each transect required 55 minutes to complete. The number of transects per day was limited to six or fewer to ensure that all transects were completed during optimal conditions.

Five transects or 50 point-counts were performed in the less abundant woodland habitat to obtain an adequate sample size. Consequently, to ensure proportional allocation of effort while avoiding bias or eventual weighting, 20 census transects and 200 point-counts were performed in the predominant cultivated habitats.

The location of transects was predetermined by random draw. In the field if the drawn site was unsuitable for sampling, *i. e.* was a highway, or was not condusive to vehicle travel, the transect was relocated to the nearest suitable transect. This sampling technique was not used for special habitat counts. Instead, these habitats were observed within a measured time period so that a simple indirect index of abundance, *i. e.* birds per hour (b/h), could be calculated. Transects or loops were walked through these habitats. No overlap occurred in any areas previously censused.

In autumn, winter, and spring, birds were observed between approximately 1 hour after sunrise and 1600 hrs, when bird activity is most consistent. This maximized the observation period while attempting to minimize the bias of including the early morning peak of bird activity (Robbins 1981). The results of the autumn, winter, and spring censuses have been expressed as relative frequency of occurrence and percent abundance by species (relative abundance values have been multiplied by 100 for easier interpretation). However, as species density cannot be derived directly from these methods and data, the breeding census has incorporated an estimate of perpedicular distance to the transect line for each bird observed.

The breeding census produces estimates of bird density and species diversity by habitat type. The technique used was the fixed-width transect method of Emlen (1971). This method allowed an approximation of breeding bird density with only one sample pass over all transects. Emlen's modified breeding bird census technique (Emlen 1978), requires the generation of song cue frequencies for particular bird species, but because of time limitations, this was not possible.

The methodology for this technique was similar to the point-count technique used for the autumn, winter, and spring censuses, except that observers did not stop every 0.10 mile, but progressed slowly (1 to 1.5 mph) down the transect, recording perpendicular distances to all birds observed. Samples were made only on days with favorable weather conditions, were started within 0.5 hour after sunrise, and extended until bird activity decreased significantly (this time varied, but was usually near 1100 hrs). Bias undoubtedly was generated by extending the sampling period beyond the norm for a breeding census (2 hours after sunrise), but this was necessary because of project time limitations. This bias would underestimate breeding pairs.

The breeding density calculated for the eastern screech-owl was generated from data collected at individual point-counts in woodland habitats using the variable circular-plot technique (Reynolds *et al.* 1980).

RESULTS

Results are organized by major habitat type. Data generated from agricultural habitats are presented in Table 1; woodland results are presented in Table 2; special habitat results are presented in Tables 3 and 4. Data generated by the breeding census are discussed separately from the other seasonal censuses. Total figures for birds observed in each season in each habitat are presented in the appendices.

Autumn Census

The autumn bird census was conducted from 4 October to 24 October 1984. The early phase of migration was not sampled because of the late initiation of this project. It is assumed that a comparison of the autumn and spring migration data will give a better representation of the species that could appear during a migration season. Migration, however, is variable in itself depending on weather patterns, and a true representation of species richness may require sampling over several years.

A total of 9,477 individuals, representing 104 species, 75 genera, and 33 families, was sighted during this census period (Appendix 2).

Agricultural habitat - Forty-four bird species and 3,400 individuals were observed during the autumn census period in agricultural habitat. The most abundant bird species was the European starling, followed by the house sparrow and red-winged blackbird (Table 1). The starling and house sparrow also had large relative frequency values which indicates these species not only showed higher population numbers than other bird species at this time, but also were more widely distributed throughout this habitat type. The red-winged blackbird had a marginally high relative frequency value that demonstrates a slightly narrower distribution than the starling or house sparrow, but a still greater distribution than other bird species present during this phase of autumn migration.

Those species with the lowest relative abundance value were the ring-necked pheasant, ring-billed gull, mourning dove, red-headed woodpecker, northern flicker, eastern phoebe, hermit thrush, rufous-sided towhee, field sparrow, savanna sparrow, grasshopper sparrow, and fox sparrow. This group of species also had low relative frequency values which means that their small population numbers reflect a very limited distribution.

Woodland habitat - A total of 63 bird species and 1,098 individuals were observed during the autumn census period in woodland habitat. The most abundant bird species was the Canada goose, followed by the American robin and white-throated sparrow (Table 2). Though the Canada goose was the most abundant species, it had a low relative frequency value which reflects a limited distribution. This phenomenon was produced by the large numbers of geese that stop-over at Evergreen Lake. This species was included in the woodland census because we felt that it was actively utilizing this habitat type as a wind break and shelter during bad weather, especially in the winter months. Bird species that exhibited the widest distributions were the northern flicker, American robin, blue jay, and white-throated sparrow.

Table 1. Summary of relative abundance and relative frequency data generated from autumn, winter, and spring agricultural censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

	AUTUMN		WINTER		SPRING	
Species	rel. abund.	rel. freq.	rel. abund.	rel. freq.	rel. abund.	rel. freq.
Canada Goose	0.18	0.003	5.78	0.012	-	-
Mallard	0.18	0.003	-	-	-	-
Northern Harrier	0.15	0.012	0.27	0.050	0.04	0.001
Cooper's Hawk	0.09	0.006	-	-	-	-
Red-tailed Hawk	0.15	0.015	-	-	0.17	0.006
Rough-legged Hawk	-	-	0.67	0.112	-	-
American Kestrel	-	-	0.27	0.050	0.08	0.003
Ring-necked Pheasant	0.02	0.003	0.40	0.012	0.04	0.001
Lesser Golden-Plover	1.62	0.003	-	-	22.75	0.017
Killdeer	0.32	0.027	-	-	0.54	0.016
Pectoral Sandpiper	2.50	0.003	-	-	-	-
Common Snipe	-	-	0.07	0.006	-	-
Ring-billed Gull	0.02	0.003	-	-	-	-
Rock Dove	2.82	0.036	4.44	0.031	0.84	0.006
Mourning Dove	0.02	0.003	-	-	0.34	0.009
Chimney Swift	0.06	0.003	-	-	1.01	0.017
Red-headed Woodpecker	0.02	0.003	0.13	0.012	0.29	0.009
Northern Flicker	0.02	0.003	0.07	0.006	-	-
Eastern Phoebe	0.02	0.003	-	-	-	-
Horned Lark	7.26	0.179	29.50	0.236	11.90	0.180
Purple Martin	-	-	-	-	0.25	0.003
Tree Swallow	-	-	-	-	0.21	0.005
No. Rough-winged Swallow	-	-	-	-	0.13	0.003
Barn Swallow	-	-	-	-	0.92	0.019
Blue Jay	0.09	0.006	-	-	1.05	0.012
American Crow	2.15	0.082	1.88	0.099	1.30	0.031
Black-capped Chickadee	-	-	0.07	0.006	0.04	0.001
House Wren	0.09	0.003	-	-	0.08	0.001
Ruby-crowned Kinglet	0.12	0.009	-	-	0.04	0.001
Hermit Thrush	0.02	0.003	-	-	-	-
American Robin	0.21	0.015	-	-	5.36	0.098
Brown Thrasher	-	-	-	-	0.34	0.008
European Starling	38.85	0.148	13.70	0.149	7.67	0.095
Tennessee Warbler	-	-	-	-	0.04	0.001
Cape May Warbler	-	-	-	-	0.04	0.001
Yellow-rumped Warbler	0.74	0.030	-	-	0.04	0.001
Black-throated Green Warb.	-	-	-	-	0.04	0.001
Palm Warbler	0.06	0.003	-	-	0.08	0.001
Northern Waterthrush	-	-	-	-	0.04	0.001
Common Yellowthroat	0.06	0.006	-	-	0.21	0.005

(Table 1 concluded on next page)

Table 1. Summary of relative abundance and relative frequency data generated from autumn, winter, and spring agricultural censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

	AUTUMN		WINTER		SPRING	
Species	rel. abund.	rel. freq.	rel. abund.	rel. freq.	rel. abund.	rel. freq.
Northern Cardinal	-	-	-	-	0.04	0.001
Indigo Bunting	-	-	-	-	0.04	0.001
Rufous-sided Towhee	0.02	0.003	-	-	0.04	0.001
American Tree Sparrow	-	-	1.75	0.050	-	-
Chipping Sparrow	-	-	-	-	0.38	0.009
Field Sparrow	0.02	0.003	-	-	-	-
Vesper Sparrow	0.09	0.006	-	-	0.50	0.017
Savannah Sparrow	0.02	0.003	-	-	0.67	0.008
Grasshopper Sparrow	0.02	0.003	-	-	-	-
Fox Sparrow	0.02	0.003	-	-	-	-
Song Sparrow	1.00	0.024	0.13	0.012	1.26	0.026
Lincoln's Sparrow	0.06	0.003	-	-	-	-
Swamp Sparrow	0.15	0.006	0.07	0.006	-	-
White-throated Sparrow	0.41	0.015	-	-	0.50	0.003
White-crowned Sparrow	0.18	0.009	-	-	0.08	0.001
Dark-eyed Junco	-	-	0.20	0.006	-	-
Lapland Longspur	-	-	0.13	0.006	-	-
Red-winged Blackbird	13.65	0.027	-	-	14.75	0.096
Eastern Meadowlark	0.21	0.009	-	-	0.46	0.014
Common Grackle	4.47	0.039	-	-	10.39	0.104
Brown-headed Cowbird	0.21	0.006	-	-	1.42	0.029
American Goldfinch	1.03	0.054	-	-	0.88	0.022
House Sparrow	20.53	0.170	40.40	0.137	12.69	0.104

Table 2. Summary of relative abundance and relative frequency data generated from autumn, winter, and spring woodland censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

Species	AUTUMN rel. abund.	AUTUMN rel. freq.	WINTER rel. abund.	WINTER rel. freq.	SPRING rel. abund.	SPRING rel. freq.
Green-backed Heron	-	-	-	-	0.13	0.002
Canada Goose	13.80	0.013	25.00	0.023	-	-
Mallard	1.00	0.006	-	-	-	-
Northern Harrier	0.30	0.010	-	-	-	-
Sharp-shinned Hawk	0.30	0.010	0.47	0.012	0.26	0.005
Red-tailed Hawk	0.50	0.013	0.47	0.012	-	-
American Kestrel	0.09	0.003	-	-	-	-
Ring-necked Pheasant	0.20	0.006	0.47	0.012	1.83	0.030
Killdeer	1.40	0.013	-	-	0.13	0.002
Pectoral Sandpiper	1.10	0.003	-	-	-	-
Solitary Sandpiper	0.09	0.003	-	-	-	-
American Woodcock	0.09	0.003	-	-	-	-
Mourning Dove	-	-	0.47	0.012	0.65	0.011
Black-billed Cuckoo	0.09	0.003	-	-	-	-
Yellow-billed Cuckoo	0.50	0.016	-	-	0.13	0.002
Barred Owl	-	-	0.47	0.012	-	-
Whip-poor-will	-	-	-	-	0.13	0.002
Chimney Swift	-	-	-	-	0.26	0.002
Ruby-throated Hummingbird	0.09	0.003	-	-	-	-
Belted Kingfisher	0.20	0.006	-	-	0.39	0.007
Red-headed Woodpecker	0.09	0.003	-	-	1.83	0.018
Red-bellied Woodpecker	0.50	0.019	2.83	0.071	0.79	0.009
Yellow-bellied Sapsucker	0.09	0.026	-	-	-	-
Downy Woodpecker	0.90	0.016	4.72	0.106	1.83	0.025
Hairy Woodpecker	0.09	0.003	-	-	-	-
Northern Flicker	3.60	0.081	-	-	2.09	0.027
Eastern Wood-Pewee	-	-	-	-	0.13	0.002
Least Flycatcher	-	-	-	-	0.52	0.007
Eastern Phoebe	0.50	0.013	-	-	0.26	0.005
Great Crested Flycatcher	-	-	-	-	0.79	0.011
Eastern Kingbird	-	-	-	-	0.13	0.002
Blue Jay	3.30	0.068	7.08	0.094	10.60	0.075
American Crow	0.50	0.029	8.49	0.106	1.70	0.016
Black-capped Chickadee	5.30	0.036	6.60	0.094	2.09	0.027
Tufted Titmouse	1.70	0.016	6.13	0.071	1.83	0.015
White-breasted Nuthatch	3.60	0.163	6.13	0.129	1.70	0.015
Brown Creeper	0.70	0.019	-	-	-	-
Carolina Wren	-	-	-	-	0.13	0.002
House Wren	0.09	0.003	-	-	3.40	0.032
Winter Wren	1.00	0.029	-	-	-	-

(Table 2 continued on next page)

Table 2. Summary of relative abundance and relative frequency data generated from autumn, winter, and spring woodland censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

	AUTUMN		WINTER		SPRING	
Species	rel. abund.	rel. freq.	rel. abund.	rel. freq.	rel. abund.	rel. freq.
Golden-crowned Kinglet	0.50	0.010	-	-	-	-
Ruby-crowned Kinglet	3.70	0.046	-	-	0.13	0.002
Eastern Bluebird	-	-	-	-	0.52	0.005
Veery	-	-	-	-	0.13	0.002
Gray-cheeked Thrush	0.09	0.003	-	-	0.13	0.002
Swainson's Thrush	0.20	0.006	-	-	-	-
Hermit Thrush	1.30	0.016	-	-	0.26	0.002
Wood Thrush	0.09	0.003	-	-	1.70	0.023
American Robin	20.10	0.078	-	-	5.76	0.055
Gray Catbird	1.00	0.029	-	-	0.26	0.005
Brown Thrasher	-	-	-	-	2.23	0.025
European Starling	4.60	0.010	-	-	2.62	0.030
Cedar Waxwing	1.80	0.003	-	-	0.13	0.002
White-eyed Vireo	-	-	-	-	0.52	0.009
Yellow-throated Vireo	-	-	-	-	0.39	0.007
Red-eyed Vireo	-	-	-	-	0.39	0.007
Blue-winged Warbler	-	-	-	-	0.26	0.002
Tennessee Warbler	-	-	-	-	3.27	0.034
Orange-crowned Warbler	0.20	0.006	-	-	-	-
Nashville Warbler	0.60	0.006	-	-	1.05	0.016
Northern Parula Warbler	0.09	0.003	-	-	-	-
Yellow Warbler	-	-	-	-	0.13	0.002
Chestnut-sided Warbler	0.09	0.003	-	-	-	-
Magnolia Warbler	0.40	0.013	-	-	0.26	0.002
Black-throated Blue Warb.	0.09	0.003	-	-	0.13	0.002
Yellow-rumped Warbler	8.10	0.059	-	-	11.91	0.057
Black-throated Green Warb.	0.50	0.016	-	-	1.44	0.020
Palm Warbler	0.09	0.003	-	-	1.96	0.020
Blackpoll Warbler	-	-	-	-	0.13	0.002
Black-and-white Warbler	0.20	0.006	-	-	0.39	0.005
American Redstart	0.09	0.003	-	-	-	-
Ovenbird	0.20	0.006	-	-	0.39	0.007
Northern Waterthrush	0.09	0.003	-	-	0.26	0.005
Louisiana Waterthrush	-	-	-	-	0.26	0.002
Common Yellowthroat	0.50	0.010	-	-	0.65	0.011
Scarlet Tanager	0.09	0.003	-	-	-	-
Northern Cardinal	0.20	0.003	1.89	0.047	1.96	0.030
Rose-breasted Grosbeak	0.20	0.006	-	-	1.31	0.016
Indigo Bunting	0.09	0.003	-	-	4.32	0.046
Rufous-sided Towhee	0.09	0.003	-	-	0.92	0.016

(Table 2 concluded on next page)

Table 2. Summary of relative abundance and relative frequency data generated from autumn, winter, and spring woodland censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

	AUTUMN		WINTER		SPRING	
Species	rel. abund.	rel. freq.	rel. abund.	rel. freq.	rel. abund.	rel. freq.
American Tree Sparrow	-	-	16.50	0.106	-	-
Field Sparrow	-	-	-	-	1.44	0.016
Song Sparrow	0.50	0.006	-	-	0.39	0.005
Swamp Sparrow	0.30	0.006	-	-	0.13	0.002
White-throated Sparrow	10.80	0.055	-	-	6.02	0.032
Dark-eyed Junco	-	-	8.49	0.059	-	-
Red-winged Blackbird	-	-	-	-	1.83	0.020
Common Grackle	0.50	0.010	-	-	3.14	0.018
Brown-headed Cowbird	-	-	-	-	3.66	0.032
Northern Oriole	-	-	-	-	0.26	0.005
American Goldfinch	1.20	0.023	-	-	2.49	0.036
House Sparrow	-	-	3.77	0.035	0.26	0.002

Winter Census

The winter bird census was conducted from 7 January to 18 January 1985. Several typical winter residents were not observed during this census period, possibly because the late snowfall did not drive them south until after our sampling was completed. Also, birds were able to forage in the middle of cultivated fields because snow-cover had not pushed them to the roadsides, and therefore, may have been missed by the observers.

A total of 2,016 individuals, representing 31 species, 29 genera, and 17 families, was sighted during the winter census period (Appendix 1). The overall number of bird species sighted on the winter census decreased 70% from that of the autumn census. The total number of individuals decreased by 79%. This is to be expected because of the movement of migrant summer residents and the passage of migrants out of the area, with only the resident or winter resident species remaining.

Agricultural habitat - Nineteen species and 1,487 individuals were observed during the winter census period in agricultural habitat. These values represent an overall decrease in the number of bird species (57%) and number of individuals (56%) sighted on the winter census as compared to the autumn census.

The most abundant species was the house sparrow, followed by horned lark and European starling (Table 1). This group of species also had high relative frequency values meaning their populations show the widest distribution of the observed bird species in this habitat type. The horned lark exhibited a wider distribution than the house sparrow and starling, most likely because the latter two are concentrated near farmsteads, structures, or wooded areas, while the horned lark is adapted to the more abundant open fields.

Species with the lowest relative abundance and frequency values were the swamp sparrow, common snipe, northern flicker, and black-capped chickadee.

Woodland habitat - A total of 212 individuals representing 17 species was observed during the winter census period in woodland habitat. The number of bird species observed in winter decreased 73% from the numbe observed during autumn, and the number of individuals decreased 81%. The greatest decreases were evident for the woodland and special habitat types. Woodlands provide breeding habitat for many migrant passerines. Woodlands also are considered migrant traps during migration seasons because they are utilized as stop-over areas for passage migrants that nest in northern woodlands or winter in southern or tropical forests. This phenomenon also may be due to the fact that populations inhabiting agricultural habitats are less diverse originally, and that the most abundant species are resident in that particular habitat.

The most abundant species (highest relative abundance value) were the Canada goose and the American tree sparrow (Table 2). The Canada goose, however, had a low relative frequency value, showing a limited distribution. The goose population was concentrated mainly around Evergreen Lake in large numbers. The tree sparrow population was more widely distributed. The most frequently observed species was the white-breasted nuthatch.

Spring Census

The spring bird census was conducted from 29 April to 15 May 1985. The results of the spring bird census were lower than expected. The very early rise in temperature and early leafing out of the vegetation led us to expect a premature surge of migrants and greater numbers than were actually observed. Apparently migration was split between an early segment that, because of clear night skies and favorable weather, trickled species through in no particular pattern, and a latter more intense period that apparently was not experienced equally in all parts of Illinois.

A total of 3,769 individuals, representing 100 species, 77 genera, and 31 families, was sighted during the spring census period (Appendix 1). The number of birds observed during the spring census increased in both number of species and number of individuals when compared to the winter census. The overall number of bird species sighted on the spring census increased 69% from that of the winter census; the total number of individuals increased by 55%.

However, the numbers of birds observed during the spring census period did not achieve the abundance observed during the autumn migration period. The total number of bird species sighted on the spring census was 5% below that of the autumn census. The total number of individuals was 60% below that observed during the autumn census period. Many factors could have produced this result, *i. e.*, weather patterns, migration behavior, and/or seasonal variation in migration phenology.

Agricultural habitat - A total of 45 species and 2,387 individuals was observed during the spring census period in agricultural habitat. These values represent a 58% and 38% increase, respectively, from the numbers recorded during the winter census period. The number of individuals was 30% below the autumn census, however, the number of species increased by 2%.

The most abundant species was the lesser golden-plover (Table 1). This species was observed locally distributed in large flocks foraging in farm fields . The horned lark, red-winged blackbird, European starling, house sparrow, and common grackle were also abundant during this phase of spring migration. The horned lark exhibited the highest relative frequency value of all species present; the remainder of species in this group show approximately the same values. The American robin appeared frequently during the census, but comparatively large numbers were not encountered.

Woodland habitat - A total of 68 species and 764 individuals were observed during the spring census period in woodland habitat. These values represent a 75% and 97% increase respectively in numbers of species and individuals observed over the winter census period. The number of individuals was 30% below that recorded for the autumn census period, however, the number of species increased by 6%.

The most abundant species was the yellow-rumped warbler followed by the blue jay (Table 2). The blue jay exhibited a wider distribution than the warbler, possibly because of the warbler's migration pattern during the census period. The blue jay is a resident species that holds loose territories throughout the year.

Special habitats

An indirect index of abundance was calculated on data generated for those bird species observed in special habitats. The index of b/h was used because it is a simple method of indicating abundance without a structured design, and because the four habitats were not large enough to yield mile-long transects to conform to the overall project design.

Special habitat 1 (SH1)- During the autumn census period 36 species and 324 individuals were observed in this late successional field habitat (Appendix 2). Individuals were observed at a rate of 132.3 b/h (Table 3). The most abundant bird species at this time was the common grackle (22.5 b/h) followed by the brown-headed cowbird (18.4 b/h). These two species exhibit flocking behavior during autumn and were roosting in this area.

Community and population numbers decreased during the winter census period to 5 species and 22 individuals. Winter birds were observed at a rate of 41.5 b/h. The American tree sparrow was the most abundant bird species at this time and was observed at a rate of 28.3 b/h. This species alone accounted for 68% of the total number of individuals observed per hour.

The spring census period yielded a larger community than the winter census period. Bird numbers had increased to 200 individuals representing 38 species. Individuals were observed at a rate of 164.4 b/h. The most abundant species at the time was the red-winged blackbird (15.8 b/h) followed by the yellow-rumped warbler (10.6 b/h), two of the more common spring migrants in Illinois.

Special habitat 2 (SH2)- During the autumn census period 66 individuals representing 23 species were observed (Appendix 2) in this early successional field and scrubby edge, at a rate of 35.1 b/h (Table 4). The most abundant species was the cedar waxwing (4.9 b/h). This species is nomadic and travels widely in flocks in search of food.

Bird numbers decreased during the winter census period to 8 individuals representing 5 species. Individuals were observed at a rate of 7.0 b/h. The most abundant species was the blue jay (2.6 b/h).

The bird community increased during the spring to 26 species and 76 individuals. The observation rate was 48.1 b/h. The most abundant bird species were the blue jay, brown-headed cowbird, and American goldfinch. All three species were observed at a rate of 5.1 b/h. All species are known to utilize forest edges.

Special habitat 3 (SH3)- During the autumn census period, 3,269 individuals representing 26 species (Appendix 3) were observed in this emergent palustrine wetland at a rate of 1,848.1 b/h Table 5). The most abundant species was the common grackle, which was observed at a rate of 1,584.9 b/h. Grackles had formed a large roost at the edge of the marsh, and in this study, accounted for 86% of the individuals observed/hour in this habitat. The European starling also was common in this habitat (101.9 b/h).

Table 3. Summary of relative abundance in birds/hour for data generated from autumn, winter, and spring special habitat censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

SPECIAL HABITAT CENSUS SH1			
Species	AUTUMN birds/hour	WINTER birds/hour	SPRING birds/hour
Great Blue Heron	1.22	-	-
Canada Goose	2.86	-	1.27
Red-tailed Hawk	0.41	-	-
Rough-legged Hawk	-	1.89	-
Ring-necked Pheasant	2.04	3.77	1.90
Northern Bobwhite	-	-	2.53
Killdeer	0.82	-	2.53
Mourning Dove	-	-	2.53
Chimney Swift	-	-	0.63
Belted Kingfisher	0.41	-	-
Red-headed Woodpecker	0.82	-	1.27
Downy Woodpecker	0.82	1.89	1.27
Hairy Woodpecker	0.41	-	-
Northern Flicker	0.82	-	2.53
Eastern Phoebe	0.82	-	-
Horned Lark	0.41	-	-
Tree Swallow	-	-	0.63
Blue Jay	2.86	-	7.59
American Crow	1.22	3.77	-
Black-capped Chickadee	2.86	1.89	2.53
White-breasted Nuthatch	1.22	-	-
Marsh Wren	0.41	-	-
Golden-crowned Kinglet	1.22	-	-
Ruby-crowned Kinglet	1.22	-	-
Veery	-	-	0.63
American Robin	11.83	-	8.23
Gray Catbird	-	-	1.27
Brown Thrasher	-	-	1.27
Cedar Waxwing	4.49	-	-
European Starling	5.31	-	3.16
Tennessee Warbler	-	-	5.70
Nashville Warbler	-	-	5.70
Yellow Warbler	-	-	3.80
Magnolia Warbler	-	-	0.63
Yellow-rumped Warbler	2.04	-	10.63
Palm Warbler	0.41	-	3.80
Common Yellowthroat	-	-	3.16
Northern Cardinal	0.41	-	1.27
Rose-breasted Grosbeak	-	-	2.53
Indigo Bunting	-	-	3.80
Rufous-sided Towhee	0.82	-	1.90

(Table 3 concluded on next page)

Table 3. Summary of relative abundance in birds/hour for data generated from autumn, winter, and spring special habitat censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

	SPECIAL HABITAT CENSUS SH1		
Species	AUTUMN birds/hour	WINTER birds/hour	SPRING birds/hour
American Tree Sparrow	0.41	28.30	-
Field Sparrow	8.98	-	3.16
Fox Sparrow	0.82	-	-
Song Sparrow	8.16	-	1.27
Swamp Sparrow	1.22	-	-
Red-winged Blackbird	10.20	-	15.82
Eastern Meadowlark	8.16	-	5.06
Common Grackle	22.45	-	1.27
Brown-headed Cowbird	18.37	-	8.86
American Goldfinch	5.31	-	9.49

Table 4. Summary of relative abundance in birds/hour for data generated from autumn, winter, and spring special habitat censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

SPECIAL HABITAT CENSUS SH2			
Species	AUTUMN birds/hour	WINTER birds/hour	SPRING birds/hour
Canada Goose	3.24	-	-
Red-tailed Hawk	1.08	0.87	0.63
Ring-necked Pheasant	1.08	-	1.27
Mourning Dove	-	-	0.63
Barred Owl	0.54	-	-
Chimney Swift	-	-	0.63
Red-headed Woodpecker	1.08	-	-
Downy Woodpecker	1.08	-	-
Eastern Phoebe	0.54	-	-
Eastern Kingbird	-	-	0.63
Blue Jay	2.70	2.61	5.06
American Crow	2.16	-	-
Black-capped Chickadee	2.16	0.87	0.63
White-breasted Nuthatch	0.54	-	-
Golden-crowned Kinglet	1.62	-	-
Ruby-crowned Kinglet	2.70	-	-
Veery	-	-	0.63
Hermit Thrush	1.62	-	-
Gray Catbird	-	-	1.90
Brown Thrasher	-	-	0.63
Cedar Waxwing	4.86	-	-
Red-eyed Vireo	-	-	0.63
Tennessee Warbler	-	-	0.63
Nashville Warbler	-	-	1.90
Black-throated Blue Warb.	1.08	-	-
Palm Warbler	-	-	2.53
Common Yellowthroat	-	-	1.27
Northern Cardinal	-	0.87	1.27
Rose-breasted Grosbeak	-	-	0.63
Indigo Bunting	-	-	3.16
Rufous-sided Towhee	0.54	-	1.90
Field Sparrow	-	-	3.16
Song Sparrow	1.08	-	-
Swamp Sparrow	1.08	-	-
White-throated Sparrow	2.16	-	2.53
Dark-eyed Junco	0.54	-	-
Eastern Meadowlark	-	-	3.16
Common Grackle	-	-	0.63
Brown-headed Cowbird	-	-	5.06
Northern Oriole	-	-	1.90
American Goldfinch	1.62	1.74	5.06

Table 5. Summary of relative abundance in birds/hour for data generated from autumn, winter, and spring special habitat censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

	SPECIAL HABITAT CENSUS SH3		
Species	AUTUMN birds/hour	WINTER birds/hour	SPRING birds/hour
Great Blue Heron	1.70	-	0.72
Canada Goose	11.89	-	6.52
Mallard	39.62	-	2.17
Rough-legged Hawk	0.57	-	-
Ring-necked Pheasant	1.13	-	2.17
Sora	-	-	0.72
Killdeer	1.70	-	1.45
Spotted Sandpiper	-	-	4.35
Solitary Sandpiper	16.98	-	2.90
American Woodcock	-	-	3.62
Mourning Dove	-	-	3.62
Rock Dove	-	4.60	-
Great Horned Owl	0.57	-	-
Belted Kingfisher	0.57	-	-
Downy Woodpecker	0.57	2.30	-
Northern Flicker	-	-	1.45
Tree Swallow	-	-	0.72
Barn Swallow	-	-	0.72
Blue Jay	1.13	-	0.72
Ruby-crowned Kinglet	1.70	-	-
Gray Catbird	-	-	0.72
American Robin	-	-	2.17
Cedar Waxwing	3.96	-	-
European Starling	101.89	-	1.45
Warbling Vireo	-	-	0.72
Tennessee Warbler	-	-	0.72
Nashville Warbler	-	-	2.17
Yellow Warbler	-	-	0.72
Black-throated Green Warb.	-	-	0.72
Yellow-rumped Warbler	0.57	-	-
Common Yellowthroat	-	-	5.80
Northern Cardinal	0.57	-	0.72
Rose-breasted Grosbeak	-	-	0.72
Rufous-sided Towhee	-	-	1.45
American Tree Sparrow	-	239.00	-
Field Sparrow	2.83	-	0.72
Song Sparrow	9.06	-	-
Swamp Sparrow	23.77	-	-
White-throated Sparrow	6.79	-	-
White-crowned Sparrow	0.57	-	-
Dark-eyed Junco	3.40	2.30	-

(Table 5 concluded on next page)

Table 5. Summary of relative abundance in birds/hour for data generated from autumn, winter, and spring special habitat censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

SPECIAL HABITAT CENSUS SH3			
Species	AUTUMN birds/hour	WINTER birds/hour	SPRING birds/hour
Red-winged Blackbird	28.30	-	8.70
Eastern Meadowlark	1.70	-	0.72
Common Grackle	1584.91	-	7.25
Brown-headed Cowbird	-	-	1.45
American Goldfinch	3.96	-	5.07

During the winter census period, community numbers dropped to 4 species and 216 individuals. Birds were observed at a rate of 248.2 b/h. The American tree sparrow accounted for 96% of the individuals observed. This habitat was utilized extensively for foraging.

Spring community numbers increased from the winter low to 101 individuals representing 27 species, which were observed at a rate of 73.8 b/h. No tree sparrows were observed during the spring census period in this habitat. The most abundant species at this time was the red-winged blackbird (8.7 b/h) followed by the common grackle (7.3 b/h).

Special habitat 4 (SH4)- During the autumn census period 1,320 individuals representing 38 species were observed in this emergent palustrine wetland (Appendix 3). Individuals were observed at a rate of 660.5 b/h (Table 6). The most abundant species at the time was the mallard (275.0 b/h), followed by the Canada goose (175.0 b/h).

The winter census period yielded 71 individuals representing 12 species which were observed at a rate of 52.6 b/h. The most abundant species at this time was the black-capped chickadee (14.1 b/h), followed by the Canada goose (12.6 b/h).

The spring community increased in numbers to 229 individuals representing 47 species which were observed at a rate of 69.7 b/h. The most abundant species at this time was the red-winged blackbird (10.4 b/h), followed by the Canada goose (9.4 b/h).

Breeding Census

Like Emlen (1971), singing males and all other observations were recorded separately during the breeding season. Only the number of singing males was used to generate breeding densities for the particular species (Appendices 4 and 5). The value obtained is then doubled to account for the females of territorial males. Silent or inactive birds, inevitably, are undetected. No corrections for male inconspicuousness were made in this study as in Emlen (1971), because no other census technique was repeated in the project area. This source of error will result in an underestimation of the true breeding density of the habitats censused. This problem, however, is not restricted to this census technique alone, but is inherent in most.

The sampling method of Emlen (1971) does allow coverage of a large area per unit time. Assumptions and problems of this method are discussed by Emlen (1971). All values expressed here reflect bird densities for the time period in which the census was performed.

This method is poorly suited for waterbirds, shorebirds, hawks, nocturnal birds, treetop birds in dense forests, and swifts or swallows that cruise about above the vegetation (Emlen 1971). The only species given density values from this group are the swallows. The majority of these birds were observed near their nest sites, and therefore, were known to breed in those particular habitats. Density values for the eastern screech-owl were calculated using the variable-circular plot method (Reynolds *et al.* 1980).

Table 6. Summary of relative abundance in birds/hour for data generated from autumn, winter, and spring special habitat censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

	SPECIAL HABITAT CENSUS SH4		
Species	AUTUMN birds/hour	WINTER birds/hour	SPRING birds/hour
Great Blue Heron	-	-	1.22
Great Egret	-	-	0.30
Green-backed Heron	-	-	0.30
Canada Goose	175.00	12.60	9.45
Wood Duck	-	-	0.61
Mallard	275.00	-	2.13
Blue-winged Teal	2.00	-	-
Northern Shovelor	1.50	-	-
Gadwall	1.00	-	-
American Wigeon	3.00	-	-
Ring-necked Duck	1.00	-	-
Turkey Vulture	0.50	-	-
Red-tailed Hawk	0.50	-	0.30
Ring-necked Pheasant	0.50	-	0.91
Semipalmated Plover	-	-	0.61
Killdeer	9.50	-	-
Greater Yellowlegs	1.50	-	0.30
Lesser Yellowlegs	0.50	-	-
Solitary Sandpiper	-	-	0.30
Least Sandpiper	-	-	1.83
Long-billed Dowitcher	0.50	-	-
Common Snipe	0.50	-	-
Mourning Dove	-	-	0.30
Red-bellied Woodpecker		0.74	-
Downy Woodpecker		1.48	0.30
Hairy Woodpecker	0.50	-	-
Northern Flicker	1.50	-	0.30
Eastern Kingbird	-	-	0.30
Tree Swallow	-	-	0.91
Barn Swallow	-	-	0.61
Blue Jay	2.50	2.22	4.27
American Crow	5.50	2.96	1.83
Black-capped Chickadee	13.50	14.10	0.30
Tufted Titmouse	-	4.44	0.30
White-breasted Nuthatch	-	2.22	-
Brown Creeper	-	2.22	-
House Wren	-	-	0.61
Sedge Wren	0.50	-	-
Marsh Wren	0.50	-	-
Ruby-crowned Kinglet	1.50	-	-
Golden-crowned Kinglet	3.50	-	-

(Table 6 concluded on next page)

Table 6. Summary of relative abundance in birds/hour for data generated from autumn, winter, and spring special habitat censuses recorded along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

SPECIAL HABITAT CENSUS SH4			
Species	AUTUMN birds/hour	WINTER birds/hour	SPRING birds/hour
Hermit Thrush	2.50	-	-
American Robin	75.00	-	1.83
Gray Catbird	-	-	1.52
Brown Thrasher	-	-	0.30
Cedar Waxwing	2.00	-	-
European Starling	2.50	-	2.44
Tennessee Warbler	-	-	0.61
Nashville Warbler	-	-	1.22
Yellow Warbler	-	-	0.61
Yellow-rumped Warbler	9.00	-	-
Black-throated Green Warb.	-	-	0.30
Palm Warbler	-	-	0.61
Northern Waterthrush	-	-	0.91
Common Yellowthroat	-	-	3.05
Northern Cardinal	-	1.48	0.30
Rose-breasted Grosbeak	-	-	0.91
Indigo Bunting	-	-	1.83
Rufous-sided Towhee	1.00	-	0.61
American Tree Sparrow	-	5.93	-
Field Sparrow	-	-	0.61
Song Sparrow	3.50	-	0.91
Swamp Sparrow	3.50	2.22	-
White-throated Sparrow	2.00	-	1.83
White-crowned Sparrow	-	-	0.61
Dark-eyed Junco	1.00	-	-
Red-winged Blackbird	11.50	-	10.37
Common Grackle	33.50	-	1.22
Brown-headed Cowbird	8.50	-	5.49
Northern Oriole	-	-	0.91
American Goldfinch	1.50	-	2.44
House Sparrow	1.50	-	-

Agricultural

Analysis of data generated from this census (Table 7) indicated an avian community density of 112.4 breeding birds/100 acres* (bb/100a) in agricultural habitats within the project area. The most abundant species was the indigo bunting (16.4 bb/100a) followed by the horned lark (14.8 bb/100a). Most breeding species concentrated in areas where the continual disturbance of cultivation was minimized, *i.e.* farmsteads, creeks, set-aside fields, etc. These features are distributed haphazardly throughout this type of habitat and may effect locally spatial breeding patterns. Species typical of grasslands, shrublands, and woodlands all are found in cultivated areas. By observation, shrubland species dominate but not necessarily in number of individuals.

Woodland

The calculated avian community density for birds breeding in woodland habitat was 192.2/100a (Table 7) during this census period. The species with the largest breeding bird population was the indigo bunting (19.6 bb/100a) followed by the house wren (16.4 bb/100a). The common crow had the least number of breeding birds at 0.8 per 400 acres in this habitat type. An over-representation of edge species is evident in the woodland habitats of the project area. This phenomenon may be due to fragmentation that has taken place in the past, which consequently created more edge habitat.

Special habitats

Breeding densities were generated for the avian communities which inhabit each of the particular special habtiat types. Sample sizes were not sufficient to calculate the breeding densities of individual species. All density values have been extrapolated to breeding birds/100 acres for the purpose of comparison.

Avian community densities for special habitats SH1 through SH4 are reported in Table 8. The habitat that supported the highest breeding bird density at the time of this study was SH2 (229.6 bb/100a), an edge habitat that surrounds an early successional field. The habitat that supported the lowest number of breeding birds was SH3 (131.2 bb/100a), an emergent palustrine wetland that is dominated by rice cutgrass, with canary reed grass bordering the water line.

*for breeding pairs divide by 2

Table 7. Summary of breeding bird densities generated for agricultural and woodland habitats occurring within the project corridor along U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

Bird species	Agricultural Census birds/100 acres	Woodland Census birds/100 acres
Ring-necked Pheasant	-	5.0
Killdeer	1.2	-
Rock Dove	2.4	-
Mourning Dove	-	5.0
Yellow-billed Cuckoo	-	6.2
Chimney Swift	1.6	-
Red-headed Woodpecker	-	5.2
Red-bellied Woodpecker	-	2.0
Downy Woodpecker	-	9.8
Northern Flicker	-	5.0
Eastern Wood-Pewee	-	11.0
Great Crested Flycatcher	-	6.6
Horned Lark	14.8	-
Barn Swallow	2.0	2.2
Blue Jay	-	14.8
American Crow	-	0.8
Black-capped Chickadee	-	9.8
Tufted Titmouse	-	6.6
White-breasted Nuthatch	-	8.2
House Wren	11.0	16.4
Wood Thrush	-	3.2
American Robin	7.0	13.2
Gray Catbird	-	9.8
Brown Thrasher	-	1.6
European Starling	2.4	-
Common Yellowthroat	1.6	3.2
Northern Cardinal	-	5.0
Rose-breasted Grosbeak	-	6.6
Indigo Bunting	16.4	19.6
Dickcissel	1.2	-
Rufous-sided Towhee	-	3.2
Chipping Sparrow	5.0	-
Vesper Sparrow	4.0	-
Song Sparrow	1.6	-
Red-winged Blackbird	8.2	3.8
Common Grackle	14.0	11.4
Brown-headed Cowbird	4.0	9.8
American Goldfinch	13.2	-
House Sparrow	11.0	6.6
Total number individuals	122.6	211.6
Total number bird species	19	29

Table 8. Breeding densities of bird communities in special habitat types calculated from data generated during the breeding census period for LaSalle, Marshall, McLean, and Woodford counties, Illinois.

Habitat	birds/100acres
Special Habitat 1	180.6
Special Habitat 2	229.6
Special Habitat 3	131.2
Special Habitat 4	147.6

Raptor survey

A reconnaissance trip was made in early March (5, 6, 7), 1985, to locate courting or breeding raptors within the project area. An automobile search, foot search, and the playback technique were performed (Fuller and Mosher 1981), but no conclusive results were obtained. Two pairs of courting red-tailed hawks and a bald eagle were observed, and several potential nest sites of different species were recorded, but no active nest sites were located for any species. Areas of interest were re-examined during the spring and breeding censuses, but no breeding activity was observed for these designated sites within the project area.

The only breeding raptors recorded for the project area during this study were a barred owl (woodland transect W5), and eastern screech-owls for the woodland habitat type. Two great horned owls are known to be present but were not observed during the breeding season and are not reported. A courting pair of sharp-shinned hawks, a Cooper's hawk, and a northern harrier also were observed but no active nests were located.

The single breeding density generated during this survey was that for the eastern screech-owl. The variable circular-plot technique (Reynolds *et al.* 1980) was used to calculate a breeding density from data generated from individual point-counts in woodland habitats. During the breeding census period, screech-owls were present at a density of 1.1 breeding birds/100a of woodland habitat within the project area.

A cursory survey for common barn-owls also was performed during this time. A random search of old barns, outbuildings, and other suitable places throughout the project area was done and the playback technique was used for this survey. No individuals were located.

Species Diversity

The species diversity index that was chosen for this study was H' (Shannon and Weaver 1949). In his comparison of several diversity indices, Karr (1968), concluded that H' varied the least with changes in sample size.

Values of species diversity for the major habitat types and special habitats are presented in Table 9. Independent of season, woodland habitat consistently showed a higher diversity of bird species during this study than did agricultural habitat, even though agricultural habitat consistently showed greater numbers of individuals. This is a typical pattern exhibited when comparing woodland and agricultural habitats. Sub-climax woodland habitat is consistently more complex than agricultural habitat and provides more niches to accomodate more bird species.

Table 9. Bird species diversities (H')* calculated from data generated for all habitat types in all seasons included in the FAP 412 project area, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

Habitat type	autumn	winter	spring	breeding
Agricultural	2.40	1.60	2.45	2.48
Woodland	2.90	2.42	3.53	3.02
Special Habitat 1	2.89	1.12	3.23	2.97
Special Habitat 2	3.18	1.49	3.26	2.79
Special Habitat 3	0.72	0.20	3.10	2.50
Special Habitat 4	1.88	2.11	3.26	3.06

* H' calculated with log e

ENDANGERED AND THREATENED BIRD SPECIES

The U.S. Department of the Interior, Fish and Wildlife Service (USDI, FWS) (1982) identified vertebrate animal taxa, native to the United States, which are being considered for addition to the List of Endangered and Threatened Wildlife. In responding to the Endangered Species Act of 1973 (16th U.S. Congress, docket 1531), which requires the determination of whether species of wildlife and plants are endangered or threatened based upon the best available scientific and commercial data, the Fish and Wildlife Service (FWS) has gathered data on taxa which have appeared at times to warrant consideration for this list of endangered and threatened wildlife. In consideration of these data, the FWS has assigned many of these taxa to one of three categories.

Category 1 comprises taxa for which the FWS currently has substantial information on hand to support the biological appropriateness of proposing to the list of species as Endangered or Threatened. Currently, data are being gathered concerning the environmental impacts of listings and the economic effects of listings and the economic effects of Critical Habitat designations. Development and publication of proposed rules on such species is anticipiated.

Category 2 comprises taxa for which information now in possession of the FWS indicates that proposing to list the species as Endangered or Threatened is possibly appropriate, but for which substantial data are not currently available to biologically support a proposed rule. Further biological research and field study will usually be necessary to ascertain the status of the taxa in this category, and it is likely that some of the taxa will not warrant listing.

Category 3 comprises taxa that are no longer being considered for listing as Endangered or Threatened. Such taxa are included in one of three subcategories, depending on the reasons for removal from consideration: a) substantial evidence exists supporting the designation of a species as extinct; b) present taxonomic and/or systematic status of a taxon does not meet the Act's definition of a "species"; c) a taxa has been proven to be more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat; further information could lead to the elevation of these taxa to categories 1 or 2.

No bird species known or thought likely to occur in the vicinity of the FAP 412 project area were assigned to any of these categories.

Four federal and 36 state endangered or threatened bird species have been recorded in Illinois (Bowles and Thom 1981). Of these, 2 federally endangered species, 13 state endangered species, and 5 state threatened species have been listed as occurring in LaSalle, Marshall, McLean, Woodford, or adjacent counties (*Illinois Audubon Bulletin* 1975 to 1984).

During this study 2 federally endangered, 6 state endangered, and 1 state threatened bird species were observed within the project area (Table 10). Life history accounts of those species observed or though likely to occur within the FAP 412 project area are included below.

Table 10. State listed endangered or threatened and federal listed endangered bird species observed or known to occur within or adjacent to LaSalle, Marshall, McLean, and Woodford counties during breeding season for the past 10 years.

Bird species	E/T	target counties	adjacent counties	observed	likelihood of occur.
Double-crested Cormorant	E	-	x	x	Y
Great Egret	E	-	x	x	Y
Black-crowned Night Heron	E	-	x	-	Y
Osprey	E	-	x	-	N
Bald Eagle	E*	-	x	x	Y
Northern Harrier	E	-	x	x	Y
Cooper's Hawk	E	x	-	x	Y
Peregrine Falcon	E*	-	-	x	Y
Common Moorhen	T	x	x	-	N
Upland Sandpiper	E	x	x	-	N
Common Tern	E	x	-	-	N
Forster's Tern	E	-	x	-	N
Black Tern	E	x	x	-	N
Short-eared Owl	E	-	x	x	Y
Brown Creeper	E	x	x	x	Y
Bewick's Wren	T	-	x	-	N
Veery	T	x	-	x	Y
Loggerhead Shrike	T	-	x	-	N
Henslow's Sparrow	T	x	x	-	N
Yellow-headed Blackbird	E	x	-	-	N

E=state endangered
T=state threatened
*=federal endangered
Y=likely to occur within FAP 412 project area
N=unlikely to occur within FAP 412 project area
observed - species was seen during this study

No federal and/or state endangered or threatened bird species were observed breeding within the project area. From the results of this study, it appears the project corridor is utilized extensively during the migration seasons as both a stop-over area for resting migrants, and a foraging area. The project area is also utilized to a lesser extent by winter residents and late migrant species.

Federal endangered species

Haliaeetus leucocephalus (Linnaeus) - Bald eagle

The range of the bald eagle extends south to Florida and Baja California, and north to Alaska and northern Canada (Brown and Amadon 1968). Part of the Canadian and north-central United States population (*H. l. alascanus* Townsend) winters in the Mississippi and Illinois River valleys. Cory (1909) and Ridgway (1913) indicated that, historically, the bald eagle in Illinois occurred along the major rivers and unsettled areas, was present year-round, and bred throughout its range. Current distribution in Illinois continues to be strongly associated with major waterways (Bowles and Thom 1981; Havera *et al.* 1984).

Nesting bald eagles in Illinois are no longer common. In 1978, two young eagles were fledged in Alexander county (Kleen 1978). Prior to this, eagles had not been reported nesting in Illinois since the 1940's (Bellrose 1944). A breeding pair has nested successfully, every year since 1980, at the Crab Orchard National Wildlife Refuge in Williamson County (Kleen 1980e, 1981e, 1982e, 1983d, 1984). Other (unsuccessful) nesting attempts in recent years have occurred in Union and Jo Daviess counties (Bowles and Thom 1981). In 1986, a bald eagle nest was discovered in Pike County (Sue Lauzon, pers. comm.). Bald eagles begin nest construction in January and lay eggs in March. Young hatch April-May. Adults tend to use the same nesting site every year (Herrick 1932).

Bald eagle use of the Mississippi River valley during winter has increased greatly as a result of alteration of the river by man (Steenhof 1978). Eagles congregate around dams, which are sources of open water, and thus provide a plentiful supply of food. Steenhof (1978) believes that food may be the most important requirement of wintering bald eagles, but that distribution is also influenced by the location of preferred perches. Southern (1963) and Jonen (1973) found that eagles on the Mississippi River in northwestern Illinois fed primarily upon fish (usually *Dorosoma cepedianum*). Because eagles also feed on crippled or dead ducks and geese, they are associated with areas of high waterfowl concentration (Griffin *et al.* 1982). Wintering eagles are found in Illinois from late September to early April (Bohlen 1978).

Bald eagles prefer large, tall trees (average 42-62 cm dbh) near rivers or reservoirs (1-10 km) for roosting and nesting (Jonen 1973, Lehman 1979, Steenhof 1978, Steenhof *et al.* 1980). The tallest trees in an area are usually preferred, especially large dead or dying trees (Jonen 1973,

Snow 1973,Steenhof 1978, Steenhof *et al.* 1980). Also, trees which have one or two open edges are favored (eg. riverbank, cropland) because they allow easy surveillance for food and accessibility (Snow 1973, Steenhof 1978, Steenhof *et al.* 1980). Eagles require a buffer zone from human disturbance around their nest sites and feeding perches (Snow 1973, Stalmaster and Newman 1978). During poor weather and winter nights, eagles move to more protected sites such as conifers or floodplains surrounded by riverbluffs (Jonen 1973, Steenhof *et al.* 1980).

Because bald eagle numbers in the continental United States have significantly declined, this species has been declared endangered and placed on the federal list of threatened and endangered species. This decline has been attributed to dwindling habitat, illegal shooting, and the adverse effects of pesticides on egg viability (Bowles and Thom 1981, Snow 1973, Stalmaster and Newman 1978).

In 1972 the Illinois Department of Conservation permanently incorporated the bald eagle into its autumn, winter, and spring waterfowl counts. Researchers from the Illinois Natural History Survey - Havana Laboratory conduct annual aerial surveys along the Illinois and Mississippi rivers, including floodplain lakes, wildlife refuges, nature preserves, and cooling reservoirs adjacent to the rivers (Havera, INHS Havana Laboratory, pers. comm.; Havera *et al.* 1984).

The bald eagle has been documented in all seasons in counties adjacent to the project area. It has been recorded in LaSalle county as a winter resident and as an autumn migrant, in McLean county as a spring migrant, and in Marshall county as a winter resident. (Kleen 1975b, 1976b, 1977c, 1978c, 1979c, 1980b, 1980c, 1981b, 1981d, 1982a, 1983). During the winter census one bald eagle was observed flying over the Mackinaw River. The floodplain forest bordering the Mackinaw River and the woodlands that surround Evergreen Lake could be utilized as roosting areas by occasional migrants.

Falco peregrinus (Tunstall) - Peregrine falcon
The peregrine falcon formerly bred from Alaska and Greenland south to Georgia and Baja California, but has been eliminated from most of the eastern U. S. It winters north to British Columbia and Massachusetts. This species occurs in Illinois as an occasional migrant along Lake Michigan (with some regularity) and as a rare migrant elsewhere (Bowles and Thom 1981).

Peregrines nest on rocky cliffs, bluffs, and vertical escarpments. River gorges and watergaps with precipitous cliffs are preferred. Large trees and city buildings may also be utilized as nest sites (Eastern Peregrine Recovery (EPFR) Team 1979).

The peregrine falcon is a predatory species that feeds almost exclusively on birds that are taken on the wing. Excellent flyers, peregrines have been recorded at speeds of approximately 275 mph (stoop). The peregrine hunts over waterways, wetlands, and open fields (EPFR Team 1979). This species requires large expanses of land over which they can capture bird prey in flight. Common prey items include, rock doves, waterfowl, shorebirds, and starlings (Hickey 1969; EPFR Team 1979).

Peregrine falcons mate for life and return to the same nesting areas in successive years (Brown and Amadon 1968). A mean clutch size of 3 to 4 eggs

(2 to 5) are laid in late March or April (Hickey 1942; Evans 1982). Incubation lasts approximately 28 to 29 days and is done by the female.

Chemical pesticides, chlorinated hydrocarbons, and, more specifically DDT and DDE, are responsible for eggshell thinning and resulted in the demise of the eastern peregrine population beginning in 1946. The last known breeding pair in Illinois was located in Jackson County in 1951 (Bohlen 1978; Smith and Parmalee 1955). There are, however, two potential but unassessed eyries in Jackson and Wabash counties (EPFR Team 1979). The peregrine falcon is known to stop over and perhaps winter in the Shawnee National Forest (EPFR Team 1979).

As of 1975, no breeding pairs occurred in the eastern United States (Fyfe *et. al.*). A recovery plan for the eastern peregrine falcon was approved in 1979. No reintroduction sites are scheduled for Illinois, but are planned for Minnesota and southern Wisconsin. The U.S. Forest Service, however, under the Shawnee National Forest Management Plan, hopes to establish two breeding pairs in the Shawnee Forest by the year 2020 (Shawnee Forest Management Plan, unpubl.).

The peregrine falcon has been recorded in both target and adjacent counties in the winter, spring, and autumn seasons. It has been recorded as both a winter resident and a spring migrant in McLean county, and as an autumn migrant in LaSalle county. (Kleen 1975b, 1975c, 1976c, 1978d, 1979b, 1980c, 1980d, 1982b, 1982c). A peregrine falcon was observed flying over farm fields two miles west of the FAP 412 project corridor during the winter 1984-85 census period.

State endangered bird species

Phalacrocorax auritus (Lesson) - Double-crested cormorant

The double-crested cormorant is restricted in its range to North America. Of the 4 subspecies discussed by Palmer (1962), only one, *Phalacrocorax auritus auritus* is likely to occur in Illinois. This subspecies breeds from the north Atlantic coast west through the St. Lawrence Seaway and Great Lakes into the Northern great plains states of the United States and central prairie provinces of Canada. After breeding it migrates south along major waterways. It winters along the Gulf Coast and in the lower Mississippi River valley.

Lewis (1929) estimated the total breeding population of double-crested cormorants at 40,000. This species has been subjected to much persecution and has suffered decline in some areas, but can become quite abundant where not molested by man (Reilly 1968).

In Illinois the double-crested cormorant is found as an uncommon migrant along the Mississippi and Illinois rivers, a rare summer resident along the upper Missisippi River, and as an occasional migrant in the remainder of the state. It formerly occurred in Illinois as a common migrant and uncommon summer resident along the Illinois River. It has declined drastically along the Illinois River since 1950 (Bohlen 1978).

The primary habitat requirement of the double-crested cormorant is an adequate and nearby food supply (Palmer 1962). Thus, it most frequently occurs near

large bodies of water. Northern populations must move south or to salt water (or both) during winter as they cannot utilize frozen waters for feeding. During winter and migration, the cormorant commonly avoids land other than outlying rocks or sandbars. It breeds in large colonies, usually on rocky islands, shorelines, or in tall trees. Human disturbance greatly reduces cormorants have been reported to desert breeding sites where they have been disturbed (Lewis 1929; Ellison and Cleary 1978). In Illinois it prefers large lakes and rivers, where it may be seen perched on snags near water (Bohlen 1978).

The double-crested cormorant may utilize the aquatic habitats in or adjacent to the project area on a temporary basis. This species has been recorded in all seasons in counties adjacent to the FAP 412 project area. During spring and autumn migration it has been recorded in LaSalle, Marshall, and Woodford counties. (Kleen 1976a, 1978a, 1979b, 1979c, 1979d, 1980d, 1981c, 1981d, 1982a, 1982b, 1982c, 1982d, 1983a, 1983b, 1983c). A flock (25) of double-crested cormorants was observed on Evergreen Lake during the autumn 1985 census. Suitable stop-over habitat is present where snags and mature trees line the lake.

Casmerodius albus (Linneaus) - Great egret

The great egret is worldwide in distribution, ranging from southeastern Europe and central Asia south to southern Africa, south and southeastern Asia, Australia, and New Zealand. In the Western Hemisphere, it breeds in the Ohio and Mississippi River valleys, the mid-Atlantic and Pacific coasts south through Mexico, and from Central America to southern Chile and Argentina. Birds winter on the south Atlantic, gulf, and Pacific coasts south into Mexico, Central, and South America. Post-breeding dispersal takes it farther north into the United States and southeastern Canada (Palmer 1962).

Great egrets nesting in the Mississippi River drainage or wandering north during late summer move downstream to winter quarters along the gulf coast, with a few individuals wintering further north at scattered inland points. (Graber, Graber, and Kirk 1978).

According to Bent (1926) the great egret was never as abundant as the snowy egret, although it is more numerous than snowy egrets in Illinois. In the early 1900's, great egret populations reached their lowest point as a result of plume hunting. Legal protection resulted in a recovery, which peaked in the mid-1930's. The gradual decline since then has been attributed to the drainage and destruction of preferred nesting habitat and drought.

In Illinois there are two summer populations of great egrets: the breeding population which arrives in spring, and a population which arrives in summer from the south where nesting starts and finishes much earlier than in Illinois (Graber *et al.* 1978). The breeding distribution in Illinois is mainly along the larger rivers. Transient great egrets appear to prefer the Illinois River to the Mississippi River, and western to eastern Illinois. Most great egrets have migrated south of Illinois by the end of October, though individuals have been reported in Illinois as late as December.

Within historic times, great egret populations in Illinois have undergone at least one major decline (late 19th and early 20th century) and a major expansion (1927 through the 1950's). The breeding population is again declining. There is great annual variation in the dispersal population, not only in numbers seen, but in arrival and departure dates. This has been attributed to variation in weather conditions. The factors that affect heron populations include all the factors which affect fish populations and their availability (Graber *et al.* 1978).

Great egrets often nest with other herons, particularly great blue herons and black-crowned night herons in bottomland forest habitat, usually within extensive tracts and not usually near the forest-edge. Most colonies are over water during part or all of the nesting season. Great egrets often place their nests in trees that have great blue heron nests, but usually place their nests lower than great blue heron nests (Hammerslough and Bjorklund 1968). Bjorklund (1975) reported that great egrets preferred silver maples and that great blue herons preferred cottonwoods at a heronry which existed near Pekin, Illinois. Great egrets show more flexibility than do great blue herons, nesting in areas without extensive forests or large trees and with smaller herons. However, in Illinois, they are found more commonly with great blue herons than with smaller herons.

Aquatic foraging areas in or near the nesting area are essential. Although the foraging of the great egret has not been defined precisely, Graber *et al.* (1978) considered this behavior to be similar to that of great blue herons, as they often are seen fishing the same lagoon. Great blue herons are associated with the natural floodplain sequence in which lagoons are filled by spring floods along major streams. As summer progresses and food requirements of the herons reaches its peak, the lagoons dry and concentrate fishes in shallow pools making them easier to catch. Whether this applies to great egrets which nest about a month later than great blue herons is unknown.

Great egrets are very social and form communal roosts from the time of their arrival in spring. Late-summer migrants increase the size of these roosting groups, which are found in bottomland forests, often near the nesting colonies of great blue herons and night herons.

Great egrets have been recorded during the breeding season and as spring and autumn migrants in counties adjacent to the FAP 412 project area. During autumn migration they have been recorded in Marshall and Woodford counties (Kleen 1978b, 1981a, 1981b, 1981d, 1982a, 1982b, 1982d, 1983a, 1983b). Great egrets were observed on the shoreline of Evergreen Lake during the spring census. Shallow tree-lined and snag-lined shorelines of Evergreen Lake provide foraging and stop-over habitats and possible breeding habitat for great egrets. Also, fields flooded during the spring afford foraging habitats for heron species.

Nycticorax nycticorax (Linnaeus) - Black-crowned night-heron

The black-crowned night-heron ranges over both the eastern and western hemispheres. In the Old World, it breeds in southern Europe, central and southern Asia, and scattered areas in Africa. In the New World, it breeds from Oregon, central Washington, southern Idaho, southeastern Wyoming, southern Saskatchewan, southwestern Manitoba, central Minnesota, central Wisconsin, southern Michigan, southern Ontario, and northeastern New Brunswick southward locally through Mexico, central America, the West Indies, and most of South America, except Brazil (Reilly 1968).

Black-crowned night-herons wander from their breeding areas during summer, generally moving northward, but also filling the gaps between their breeding and wintering ranges. They winter throughout their breeding range in South America and in North America from Oregon south to Baja California east to Utah, central Arizona, and New Mexico. Their winter range extends along the Atlantic and Gulf coasts of the United States from Massachusetts to southern Texas, along the Mississippi and Ohio River valleys to southern Illinois, and from eastern and central Mexico southward through Central America, with the possible exception of the Yucatan Peninsula. The actual distribution of breeding colonies within the breeding range of the black-crowned night-heron is poorly known (Palmer 1962).

The population of the black-crowned night-heron in many areas has been reduced by drainage, land clearing, and development, although colonies often persist even when surrounded by human activity (Palmer 1962).

Black-crowned night-herons have been recorded from most areas in Illinois. There are few records from the northern part of the state, although, this may reflect a lack of observers, as suitable habitat appears to be present. Graber *et al.* (1978) listed the locations and dates of black-crowned night-heron nesting colonies reported from Illinois. All but four of these (located in Waukegan, Plainfield, Clear Lake, and East St. Louis) are now gone, indicating a serious decline in the black-crowned night-heron population of the state. The actual extent of this decline, however, is hard to determine as small colonies and individual nests often are well-concealed and easily overlooked (Graber *et al.* 1978).

Black-crowned night-herons usually nest in trees, singly or in colonies. They may nest in mixed colonies with other species of herons and egrets. When black-crowned night-herons nest with great egrets or great blue herons, the black-crowned night-herons always build their nests beneath the canopy and lower than those of the larger birds (Graber *et al.* 1978). Black-crowned night-herons seem to use a greater variety of habitats for nesting than do other herons. They have been known to nest in such situations as upland orchards, extensive bottomland forests, second-growth timber, pasture, and even in towns and cities. Nesting has been reported in treeless open marshland in herbaceous vegetation, but not since the last century (Nelson 1877; Murchison 1892, in Graber *et al.* 1978).

Black-crowned night-heron nests have been found in a variety of deciduous trees including ash, willow, silver maple, oak, elm, hackberry, catalpa, boxelder, and European larch. The variety of plant species in which it nests suggests that nest sites are chosen on the basis of some factor, probably food availability, other than the structure of the nest tree.

Little is known about the foraging habits of the black-crowned night-heron, primarily because of its noctural habits. Most of these birds are inactive from 0800 hours to 1700 hours (McCarty 1928, in Graber *et al.* 1978). Stomach contents have included fishes, frogs, large aquatic insects, and occasionally small reptiles and mammals.

Black-crowned night-herons have been recorded during the breeding season in counties adjacent to the FAP 412 project area and as spring and autumn migrants in LaSalle, Woodford and surrounding counties (Kleen 1978a, 1978d, 1979b, 1981d, 1982a, 1982b, 1982d, 1983a, 1983b). Though the black-crowned night-heron is not known to breed within the project area, suitable foraging and resting habitat does occur on Evergreen Lake and along the Mackinaw River where snags and trees line shallow water.

Accipiter cooperii - Cooper's hawk

Cooper's hawks breed from Baja California to southern Canada east to the Atlantic coast. They winter from the northern United States to Central America (Reilly 1968).

Bent (1937) reported that the Cooper's hawk had been declining steadily for 30 years, which he attributed primarly to a lack of prey species. He also considered the possibility of persecution by man as a cause for this decline. The pre-World War II decline has been attributed to heavy hunting pressure. Though hunting pressure decreased after World War II, the population has continued to decline. Continuation of the population decline is believed to be the result of pesticide poisoning (Henny and Wight 1972). In the northeastern United States (including Illinois) and southeastern Canada, Henny and Wight (1972) estimated that the Cooper's hawk population was declining at an annual rate of 25%. In Illinois, Bohlen (1978) described the Cooper's hawk as an uncommon migrant and winter resident, a rare summer resident in north and central Illinois, and an occasional resident in the south.

Cooper's hawks prefer mature deciduous forests and stay near cover except when hunting. They hunt from a perch, usually for medium-sized birds (*i. e.*, starlings, robins, blackbirds, meadowlarks, flickers), but will capture chipmunks and squirrels (Brown and Amadon 1968). The prey items indicate that Cooper's hawks will hunt in open areas.

Cooper's hawks have been recorded during the breeding season in Marshall county, during the winter in LaSalle, Marshall, McLean and surrounding counties, and during autumn migration in surrounding counties (Kleen 1975b, 1976b, 1977c, 1980c, 1981c, 1982b, 1982c, 1983a). Cooper's hawks were observed during the autumn and breeding census periods of this study. Though no nesting activity was observed, wooded areas around Evergreen Lake, the Mackinaw River, and Carlson Nature Preserve provide suitable breeding habitat within the FAP 412 project area. Foraging habitat is abundant and a reasonable supply of prey species should be available.

Circus cyaneus (Linneaus) - Northern harrier (Marsh hawk)

The northern harrier breeds in the southern boreal and northern temperate climatic zones of the Holarctic region. In winter it withdraws to the southern half of its breeding range and south to northwestern South America, northern Africa, India, and southern China (Reilly 1968).

Reilly (1968) stated that the northern harrier was not a rare bird, but that hunting pressure and habitat destruction were causing its number to decline. Hamerstrom (1969) reported a "pronounced and continuous" decline of northern harriers in central Wisconsin since 1960. He reported a 70% decrease in the number of migrants through the area from 1960 through 1965 and a similar decrease in the number of nests, eggs, and young fledged. The presence of an adequate potential breeding population indicated that the reproductive rate had been reduced, possibly due to pesticides acting through the avian component of the northern harrier's diet (Hamerstrom 1969).

The northern harrier inhabits a wide variety of open areas but shows a preference for marshes, wet fields, and prairies. It nests on the ground or in low vegetation. It is usually seen cruising a few meters above the ground and beats the bush systematically to flush its prey (*i. e.*, small mammals, birds, and insects) (Grossman and Hamlet 1964; Brown and Amadon 1968; Reilly 1968). In Illinois the northern harrier is described as a common migrant and winter resident and an occasional permanent resident (Bohlen 1978).

The northern harrier has been recorded during the breeding season as well as in spring, autumn, and winter in counties adjacent to the FAP 412 project area. It has been recorded in LaSalle and McLean counties during the winter, spring and autumn, and in Marshall and Woodford counties during the winter (Kleen 1975a, 1975b, 1976b, 1977a, 1978b, 1978c, 1979c, 1980c, 1980d, 1981c, 1981d, 1982b, 1982c, 1983a, 1983c). Northern harriers were observed in the project area in all seasons. Most were seen in the autumn and winter, foraging over weedy set-aside fields in agricultural areas. Only marginal breeding habitat occurs within the project area, and it is doubtful that this species breeds there.

Asio flammeus (Pontoppidan) - Short-eared owl

The short-eared owl is a widely distributed species, breeding throughout the Old and New Worlds between latitudes 40°N and 70°N, as well as in northwestern and southern South America, the northern Andes, the mouth of the Orinoco in Venezuela, Hawaii, the West Indies, and the Galapagos. It winters from southern Canada, central Europe, and southern Siberia to northern Mexico, the Gulf Coast, southern Florida, central Africa, southern Asia, and Borneo. While seven subspecies are described from this area, only one subspecies, occurs in the main European, Asian, and North American range.

In Illinois Bohlen (1978) described the short-eared owl as an uncommon migrant and winter resident and a rare summer resident in northern and central portions of the state.

The short-eared owl is a crepuscular species found in open areas, usually marshy situations and overgrown fields (Bohlen 1978). It may be locally common, but cultivation of fields and drainage of marshes is restricting its

range (Reilly 1968). Nests are constructed of grasses on the ground among high grasses, usually near marshy areas (Reilly 1968; Burton 1973).

Short-eared owls feed primarily upon small mammals (mice, voles, and shrews), but also will take small birds. Strong short-eared owlets also will feed on the weaker owlets in their own brood. Their territories have been calculated to be 15 to 20 hectares or larger in size (Bent 1938; Burton 1973).

The short-eared owl has been recorded during the winter season in LaSalle, Marshall, and McLean counties (Kleen 1975b, 1977b, 1977c, 1979d, 1980c, 1981c, 1982b, 1982d, 1983a, 1983c). It has been recorded in adjacent counties in all seasons. During this study six short-eared owls were observed foraging over weedy set-aside fields within or immediately adjacent to the FAP 412 project area. There are no records of this species nesting within the project area, and only marginal breeding habitat is present. The project area is most likely used by the short-eared owl, as foraging and wintering habitat.

Certhia americana Bonaparte - Brown creeper

Certhia americana breeds in Manitoba, Ontario, Quebec, and Newfoundland south to Nebraska, Iowa, Wisconsin, Michigan, Ohio to New York, and Massachusetts. It winters in much of its breeding range south to Texas, the Gulf Coast, and Florida (American Ornithologists' Union 1957). The American Ornithologists' Union (1957) does not list Illinois to be within the species' breeding range; however, evidence indicates that it does breed here (Kleen 1980a, 1981a). George (1971) suggested that the Illinois population of brown creepers might represent an undescribed form different from that known to inhabit more northern coniferous forests.

The brown creeper occurs in Illinois as a common migrant and winter resident, and an occasional summer resident (Bohlen 1978). The Cache, Kankakee, Mississippi, Sangamon, and Sugar rivers appeared to be the center of distribution for breeding populations in Illinois as late as 1981 (Bowles and Thom 1981).

The brown creeper is a diminutive bird with a relatively long, decurved bill. This species frequents deciduous and mixed woodlands, with floodplain forest and cypress swamps being its primary habitat in Illinois (Bowles and Thom 1981). Humid atmosphere, dense tree growth, low sun penetration, and a considerable extent of undisturbed woodland dictated the brown creeper's breeding distribution in Massachusetts (Bent 1948).

Brown creepers are bark foragers and feed primarily upon insects and spiders that are taken from crevices or the bark surface. Brown creepers are also known to take a small amount of mast, seeds, and nuts (Davis 1978). This species usually is seen spiraling upward on tree trunks probing the bark with its bill.

The brown creeper builds a hammock shaped nest under loose tree bark (Bent 1948; Davis 1978). Tree species does not appear to influence the nest site, but dead trees with peeling bark are preferred. Dutch Elm desease may have allowed the extention of the species breeding range in Illinois, but this phenomenon seems only temporary (Davis 1978). Brown creepers occasionally

nest in hollow trunks or branches, and will roost in groups (Bent 1948). It appears that the availability of nest sites may be a principal factor in attracting creepers as a breeding species. The brown creepers will winter wherever relatively mature forests occur (Mengel 1965).

Little information describing the nesting ecology of the brown creeper in Illinois is available. Nesting may be sporadic, but general knowledge of its distribution in Illinois needs further study. Overall, preservation of floodplain forest is critical to the brown creeper as a breeding bird in Illinois (Bowles and Thom 1981).

The brown creeper has been recorded in counties adjacent to the FAP 412 project area during the breeding, winter and fall seasons. It has been recorded as a winter resident in LaSalle, Marshall, McLean and Woodford counties, and as a breeding resident in Marshall, McLean, and Woodford counties (Kleen 1974, 1975b, 1976b, 1977c, 1978c, 1979a, 1979c, 1980c, 1981d, 1982a, 1982c, 1983a, 1983b) Brown creepers were seen during this census in wooded edge and woodland habitats. Suitable breeding habitat does occur within the project area, but no nesting brown creepers were observed.

State threatened species

Catharus fuscescens (Stephens) - Veery

The veery breeds across southern Canada from eastern British Columbia to central Newfoundland, south through the Rocky Mountains to northeastern Arizona; and in northeast South Dakota, southcentral Minnesota east to southern Wisconsin, throughout the southern edge of the Great Lakes and south, and in the Appalachians from New Jersey to northern Georgia. It winters from Central America to Brazil (Terres 1980; Bowles and Thom 1981).

In Illinois, the veery is a common migrant in spring and an uncommon migrant in fall. It is an occasional resident in the north but a very rare summer resident in the upper part of central Illinois (Bohlen 1978). Recently, it was suggested to be extending its breeding range southward (Graber and Graber 1973; Birkenholz 1979).

The veery is an inhabitant of damp deciduous, mixed and coniferous forest throughout much of its range (Dilger 1956). The preferred habitat in Illinois is apparently lowland second growth deciduous forest with damp dark thickets and a dense understory (Graber and Graber 1973; Birkenholz 1979). This species also occurs in upland habitat as well as residential areas.

The veery usually nests on or near the ground, though sometimes in a low shrub or sapling. The nest consists of a foundation of dead leaves, weed stems, grasses, and strips of bark. The nest is lined with dried grasses (Terres 1980).

The veery's diet consists mostly of insects (60%), which it obtains by foraging along the forest floor turning over leaves with its bill, or by feeding in the tree canopy. Wild fruit is also a large part of the veery's diet, expecially during fall migration (Bent 1949; Sousa 1982).

In Illinois, two subspecies of the veery occur. The most prominent is *Catharus fuscescens salicicola*, a gray, western race. The less common subspecies is *Catharus fuscescens fuscescens*, a red, eastern race (Graber, Graber, and Kirk 1971).

Reason for threatened status in Illinois: Little information is known about the nesting status of this thrush in Illinois. The actual breeding population may be low. Destruction of forests may be contributing to its decline (Bowles and Thom 1981). Nesting sites have been documented in Boone, Iroquois, Kankakee, Lake, Lee, Piatt, and Winnebago counties. Veeries have been known to summer in Coles, Cook, Kane, Marshall, Mason, McLean, Ogle, Vermilion, and Will counties (Kleen 1978c, 1979a, 1980a, 1981a, 1982a; Birkenholz 1978).

The veery has been recorded during the autumn and breeding season in McLean and adjacent counties, and in Marshall county in the breeding season (Kleen 1975c, 1976c, 1978d, 1979a, 1980a, 1983a). Potential nesting habitat exists in those wooded areas with a well-developed understory, as along the Mackinaw River and in the Carlson Nature Preserve. Other wooded areas are suitable for stop-over habitats during migration. Three veeries were observed during the spring census period of this study.

ECONOMICALLY IMPORTANT BIRD SPECIES

Bird species considered to be economically important for consumptive purposes and observed within the FAP 412 project area are listed in Table 11. The most abundant game species observed during this census period were the Canada goose and the mallard. Most observations were associated with Evergreen Lake. This lake is a significant stop-over area during migration seasons, a wintering area for several thousand geese and a smaller population of mallards, and a breeding area for both geese and mallards.

Canada geese were locally abundant in woodland habitat near water in both the autumn and winter census periods (Table 2), and marginally abundant in agricultural habitats in winter. This habitat was primarily used for foraging on waste grain. Geese also were present in both emergent palustrine wetlands (SH3, SH4) during all seasons (with the exception of the winter season in the smaller wetland (SH3)). Most of the breeding activities were confined to areas of Evergreen Lake that were not located on our census routes, *i.e.* islands, low shores, etc., and also the two palustrine wetlands habitats in this study. Breeding densities were incorporated into the community density of each of these special habitats. At least 10 breeding pairs were observed during the breeding census with geese both on the nest and trailing young.

Ring-necked pheasants were observed more often in woodland than in agricultural habitat. Special habitat SH 1, a late successional field, supported the greatest number of pheasants per unit time than other special habitat areas, and a proportionally greater number of pheasants was observed in this late successional field than was observed in all agricultural or woodland habitats.

Table 11. Economically important species observed within the FAP 412 project area, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

	agricultural	woodland	special habitat
Snow goose *	-	-	-
Canada goose	x	x	x
Wood duck	-	-	x
Mallard	x	-	x
Blue-winged teal	-	x	x
Northern shovelor	-	-	x
Gadwall	-	-	x
American wigeon	x	-	x
Ring-necked duck	-	-	x
Scaup sp.	-	-	x
Ruddy duck *	-	-	-
Ring-necked pheasant	x	x	x
Northern bobwhite	-	x	x
Sora	-	-	x
Common snipe	x	-	x
American woodcock	-	x	x
Mourning dove	x	x	x

* observed within project area but not on designated transect route

Cultivated habitats are continually disturbed and afford little permanent shelter for game species. Results of this study indicate that within the FAP 412 project corridor, pheasants concentrated in relatively undisturbed areas and areas of permanent cover, such as riparian strips along creeks, railroad strips, brushy areas that are not utilized as farmland, or farm woodlots. No pheasants were flushed from set-aside fields during this study. In agricultural areas, pheasants were flushed mainly from brushy areas near creeks and an occasional farmstead.

Woodlands, woodlots, brushy areas, or permanent cover adjacent to cultivated areas constitute habitat for pheasants within the project area. Clean farming practices have severely limited refugia for pheasants and other species. If pheasants are to persist within the project area, it is important to preserve permanent undisturbed cover.

The calculated breeding density for the ring-necked pheasant in woodland habitats at the time of this study was 5.0 breeding birds/100 acres (Table 7). Pheasants are polygamous; consequently, this estimate of breeding birds may underestimate the true density. Sample sizes in the remaining habitat types were not sufficient to generate breeding densities. Pheasants are incorporated into the community density values of both special habitat 1, a late successional field, and special habitat 4, an emergent palustrine wetland (Table 8).

Mallards were observed in small numbers in agricultural and woodland habitats during the autumn census period (Tables 1 and 2), but were abundant in special habitat SH1 and special habitat SH4, the two wetland habitats in this study. Mallards were particularly abundant in these two areas during the autumn census period (Tables 5 and 6), being the most common species observed in autumn in special habitat SH4.

Mallard breeding activity, like that of the Canada goose, was concentrated in areas of Evergreen Lake that were not located on our census route, but this species, nonetheless, is incorporated in the communitiy values for special habitats SH3 and SH4. Four pairs of breeding mallards were observed during the breeding census period.

Two covies of northern bobwhite were discovered within the FAP 412 project corridor, but numbers of birds were not determined. A small resident population was reported through personal communication (Ben Gildersleeve, McLean Co.) in a wooded segment along the Mackinaw River.

The remaining species in Table 11 represent insignificant populations occurring within the FAP 412 project area as determined by this study and will not be discussed further. This should not be interpreted to mean that these bird species are not significant. The numbers observed, however, do not justify the assumption that these species represent large populations occurring within the project area.

DISCUSSION

Bird populations that frequent or inhabit the FAP 412 project area are typical representatives of the avifauna that is associated with the respective habitat types found within this corridor. A greater proportion of edge-living species was evident in all habitat types, however. This phenomenon is usual where extensive fragmentation of the forest has occurred. Population trends or habitat utilization may only be inferred, not reported, because of the limited scope of this study.

The seasonal dynamics of the project area appeared typical with respect to numbers of species and numbers of individuals observed during each census period. Bird species numbers were greatest during the migration census periods and predictably lowest during the winter census period for the majority of the habitat types within the project area.

The richest of the seasonal habitats within the project area, in numbers of species, was the woodland habitat type during the spring census period (Appendix 2). Woodland habitat within the project area consistently supported the greatest number of bird species of either major habitat type, with the exception of the winter census period. The agricultural habitat type within the project area, however, consistently supported the greatest number of individuals (Appendix 5). Therefore, the habitat type that supports the greatest number of individuals may not necessarily support the most diverse avifauna. Bird species diversity was consistently higher in the woodland habitat type when compared to the agricultural habitat type within the project area (Table 9).

No explanation can be offered for low species count in the woodland habitat type during the winter census period because of the limited survey that was performed during this study. However, relative abundance of food resources, bird species present, and the fragmented condition of the woodlands are suggested as contributing factors to this phenomenon.

The greatest number of breeding bird species in a major habitat type within the project area was recorded for the woodland type (Table 8). Sixty percent more bird species and 73% more individuals per 100 acres were observed in the woodland when compared to the agricultural habitat type during this census period.

Special habitat SH2, an early successional field surrounded by forest-edge habitat, produced a very high breeding bird community density (Table 9). Although no nests were located in the field itself, edge habitats are known to be attractive to many species (Karr 1968).

State listed endangered or threatened and federal listed endangered bird species were documented within the FAP 412 project area during this study. These species include the double-crested cormorant, great egret, bald eagle, northern harrier, Cooper's hawk, peregrine falcon, short-eared owl, brown creeper, and veery. Habitat types that were utilized by these species include woodland, pasture or grassland, wetlands, and lakes and ponds. Proportionally, endangered and threatened species were encountered more frequently in the woodland habitat type within the project area. The greatest number of species and individuals were observed during the autumn census period. One Cooper's hawk and one northern harrier were observed

during the breeding census period, but no active nests were located. Endangered and threatened species obsreved in this study appeared to utilize the project area during this study as a migration corridor, stop-over, and foraging area mainly during the fall census period, and to a lesser extent, during the winter census period.

Of the major habitat types within the project area, upland game birds were observed more frequently in the woodland habitat type. The ring-necked pheasant, however, was proportionally more abundant in special habitat SH1, a late successional field habitat, especially during the breeding census period. The greatest number of upland game birds, for all habitat types, was observed during the spring census period.

Waterfowl were concentrated on the open water areas of Evergreen Lake and the palustrine wetlands (special habitats SH3 and SH4). Waterfowl concentrations were consistently higher during the autumn census period for all habitat types, with the exception of the Canada goose in the agricultural habitat type. Winter concentrations of geese were greatest in the agricultural habitat type within the project area during this study.

Canada geese and mallards comprised the majority of the waterfowl observed within the project area, however, the palustrine wetland, special habitat SH4, attracted a more diverse compliment of waterfowl during the autumn census period.

From the results of this study and by observation, it appears that the project corridor is not heavily utilized by endangered or threatened bird species. The woodland habitat type is consistently higher in all categories except total numbers of individuals observed and number of species present during the winter census period.

A high proportion of edge-living species were observed in both woodland and agricultural habitat types within the project area. This may be the result of forest fragmentation that has occurred in the past.

No quantitative or qualitative comments can be made about breeding bird densities of the major habitat types with respect to their comparison with other values obtained for similar habitat types. With the limited scope of this survey and the bias that is present, population densities may appear artificially low. A more detailed study would establish the relative abundance relationships of bird populations within the FAP 412 project area.

AKNOWLEDGEMENTS

We especially would like to thank Mark J. Wetzel for his guidance and support in the preparation of this report. We would also like to thank Mary Kay Solecki and John B. Taft for their detailed habitat descriptions which required both time and botanical expertise. Also, Drs. L. M. Page and W. E. LaBerge for reviewing this manuscript.

REFERENCES

American Ornithologists' Union. 1957. Check-list of North American birds. 5th ed. Lord Baltimore Press, Baltimore, Maryland. xii + 591 pp.

Bellrose, F. C. 1944. Bald eagles nesting in Illinois. Auk 61(3):467-468.

Bent, A. C. 1926. Life histories of North American marsh birds. Orders Ondontoglossae, Herodiones, and Paludicolae. U.S. Nat. Mus. Bull. 135. xii + 490 pp.

Bent, A. C. 1937. Life histories of North American birds of prey. Order Falconiformes (Part 1). U.S. Nat. Mus. Bull. 167. viii + 409 pp.

Bent, A. C. 1938. Life histories of North American birds of prey. (Pt. 2). Orders Falconiformes and Strigiformes. U.S. Nat. Mus. Bull. 170. vii + 482 pp. + 92 pls.

Bent, A. C. 1948. Life histories of North American nuthatches, wrens, thrashers, and their allies. Order Passeriformes (Families Sittidae, Certhiidae, Chamaeidae, Cinclidae, Troglodytidae, and Mimidae). U.S. Nat. Mus. Bull. 195. xii + 475 pp.

Bent, A. C. 1949. Life histories of the North American thrushes, kinglets, their allies. Order Passeriformes (Families Turdidae and Sylviidae). U.S. Nat. Mus. Bull. 196. viii + 454 pp.

Bjorklund, R. G. 1975. On the death of a midwestern heronry. Wilson Bull. 87(2):284-287.

Birkenholz, D. E. 1979. Summering veeries in central Illinois. Illinois Audubon Bull. 187:25.

Blondel, J., C. Ferry, and B. Franchot. 1981. Point counts with unlimited distance. Stud. Avian Biol. No. 6:414-420.

Bohlen, H. D. 1978. An annotated check-list of the birds of Illinois. Illinois St. Mus. Pop. Sci. Ser. Vol. 9. viii + 156 pp.

Bowles, M., and R. H. Thom. 1981. Endangered and threatened birds. pp. 34-58, *In* Natural Land Institute. Endangered and threatened vertebrate animals and vascular plants of Illinois. Illinois Dept. Conserv., Springfield.

Brown, L., and D. Amadon. 1968. Eagles, hawks, and falcons of the world, vols. I & II. McGraw-Hill Book Co., New York. 945 pp. + 15 pls.

Burton, J. A., ed. 1973. Owls of the world: their evolution, structure and ecology. E. P. Dutton and Co., Inc., New York. 216 pp.

Christman, S. P. 1984. Plot mapping: estimating densities of breeding bird territories by compiling spot mapping and transect techniques. Condor 86:237-241.

Cochran, W. G. 1963. Sampling Techniques, 2nd ed. John Wiley and Sons, Inc. New York. xvii + 413 pp.

Cory, C. B. 1909. The birds of Illinois and Wisconsin. Field Mus. Nat. Hist. Zool. Ser. 9(131):1-766.

Dawson, D. G. 1981. The usefulness of absolute ("census") and relative ("sampling" or "index") measures of abundance. Stud. in Avian Biol. No. 6: 554-558.

Davis, C. M. 1978. A nesting study of the brown creeper. pp. 237-263 *In* D. A. Lancaster ed., The Living Bird, Vol. 17. The Laboratory of Ornithology, Cornell Univ., Ithaca, New York.

DeSante, D. F. 1981. A field test of the variable circular-plot censusing technique in a California coastal scrub breeding bird community. Studies in avian biology No. 6:177-185.

Dilger, W. C. 1956. Relationships of the thrush *Catharus* and *Hylocichla*. Syst. Zool. 5(4):174-182.

Eastern Peregrine Recovery Team. 1979. Eastern peregrine recovery plan. U. S. Fish and Wildlife Service. May 1979. 147 pp.

Ellison, L. N., and L. Cleary. 1978. Effects of human disturbance on breeding of double-crested cormorants. Auk 95(3):510-517.

Emlen, J. T. 1977. Estimating breeding season bird densities from transect counts. Auk 94:455-468.

Evans, D. 1982. Status report on twelve raptors. U. S. Fish and Wild. Serv. Spec. Sci. Rep. Wildl. No. 238. 68 pp.

Franzreb, K. E. 1981. A comparative analysis of territorial mapping and variable - strip methods. Stud. Avian Biol. No. 6:164-169.

Fyfe, R., S. Temple, and T. Cade. 1876. The 1975 North Amnerican peregrine falcon survey. Can. Field-Nat. 90(3): 228-273.

George, W. G. 1971. Vanished and endangered birds of Illinois: A new 'black list' and 'red list'. Audubon Bull. 158:2-11.

Graber, R. R., and J. W. Graber. 1968. A comparative study of bird populations in Illinois, 1906 - 1909 and 1956 - 1958. Illinos Nat. His. Bull. Vol. 28, Art. 3. 528 pp.

Graber, J. W., and R. W.[sic] Graber. 1973. Nesting distribution of the veery in Illinois. Illinois Audubon Bull. 164:52-54.

Graber, R. R., J. W. Graber, and E. L. Kirk. 1971. Illinois birds: Turdidae. Illinois Nat. Hist. Surv. Biol. Notes No. 75. 44 pp.

Graber, R. R., J. W. Graber, and E. Kirk. 1978. Illinois birds: Ciconiiformes. Illinois Nat. Hist. Surv. Biol. Notes No. 97. 40 pp.

Griffin, C. R., T. S. Baskett, and R. D. Sparrowe. 1982. Ecology of bald eagles wintering near a waterfowl concentration. U. S. Fish Widl. Serv. Spec. Sci. Rept. Wildl. No. 247. 12 pp.

Grossman, M. L., and J. Hamlet. 1964. Birds of prey of the world. Clarkson N. Potter, Inc., New York. 496 pp.

Hamerstrom, F. 1969. A harrier population study, pp. 367-383. *In* J. J. Hickey, ed. Peregrine falcon populations, their biology and decline. Univ Wisconsin Press, Madison.

Hammerslough, J. S., and R. G. Bjorklund. 1968. Radio tracking of prematurely dislodged nestling herons. Jack - Pine Warbler 46(2):57-61.

Havera, S. P., R. D. Crompton, and F. C. Bellrose. 1984. Aerial inventories of bald eagles in Illinois, 1957-1974. *In* W. E. Southern, ed. Development in bald eagle research and management: Mississippi region. *In press.*

Henny, C. J., and H. M. Wight. 1972. Population ecology and environmental polution: red-tailed and coopers hawks. pp. 229-250, *In* Population ecology of migratory birds: a symposium. U.S. Dept. Int., Wildl. Res. Rept. 2. U. S. Dept. Int., Fish Wildl. Serv., Bur. Sport Fish. Wildl., U.S. Govt. Print. Off., Washington, D.C.

Herrick, F. H. 1932. Daily life of the American Eagle: early phase. Auk 49(3):307-323.

Hickey, J. 1942. Eastern populations of the duck hawk. Auk 59:176-204.

Hickey, J. 1969. Peregrine Falcon Populations: Their Biology and Their Decline. Univ. Wisconsin Press, Madison. 596 pp.

Jonen, J. R. 1973. The winter ecology of the bald eagle in west-central Illinois. Unpubl. M.S. thesis, Western Illinois Univ., Macomb. 84 pp.

Karr, J. R. 1968. Habitat and avian diversity on strip mined land in east-central Illinois. Condor 70:348-357.

Kleen, V. M. 1974. Field Notes: 1974 Spring migration. Illinois Audubon Bull. 170:14-22.

Kleen, V. M. 1975a. Field Notes: 1974 Fall migration. Illinois Audubon Bull. 172:23-34.

Kleen, V. M. 1975b. Field Notes: 1975 Winter season. Illinois Audubon Bull. 173:19-23.

Kleen, V. M. 1975c. Field Notes: 1975 Spring migration. Illinois Audubon Bull. 174:28-38.

Kleen, V. M. 1976a. Field Notes: 1975 Fall migration. Illinois Audubon Bull. 176:28-37.

Kleen, V. M. 1976b. Field Notes: 1976 Winter season. Illinois Audubon Bull. 177:25-32.

Kleen, V. M. 1976c. Field Notes: 1976 Spring migration. Illinois Audubon Bull. 178:25-36.

Kleen, V. M. 1977a. Field Notes: 1976 Breeding season. Illinois Audubon Bull. 179:34-42.

Kleen, V. M. 1977b. Field Notes: 1976 Fall migration. Illinois Audubon Bull. 180:36-47.

Kleen, V. M. 1977c. Field Notes: 1977 Winter season. Illinois Audubon Bull. 181:38-42.

Kleen, V. M. 1978a. Field Notes: 1977 Breeding season. Illinois Audubon Bull. 183:30-39.

Kleen, V. M. 1978b. Field Notes: 1977 Fall migration. Illinois Audubon Bull. 184:40-51.

Kleen, V. M. 1978c. Field Notes: 1978 Winter season. Illinois Audubon Bull. 185: 36-42

Kleen, V. M. 1978d. Field Notes: 1978 Spring migration. Illinois Audubon Bull. 186:27-39.

Kleen, V. M. 1979a. Field Notes: 1978 Breeding season. Illinois Audubon Bull. 187:27-36.

Kleen, V. M. 1979b. Field Notes: 1978 Fall migration. Illinois Audubon Bull. 188:39-52.

Kleen, V. M. 1979c. Field Notes: 1979 Winter season. Illinois Audubon Bull. 189:18-24.

Kleen, V. M. 1979d. Field Notes: 1979 Spring migration. Illinois Audubon Bull. 190:23-36.

Kleen, V. M. 1980a. Field Notes: 1979 Breeding season. Illinois Audubon Bull. 191:25-34.

Kleen, V. M. 1980b. Field Notes: 1979 Fall migration. Illinois Audubon Bull. 192:24-36.

Kleen, V. M. 1980c. Field Notes: 1980 Winter season. Illinois Audubon Bull. 193:25-31.

Kleen, V. M. 1980d. Field Notes: 1980 Spring migration. Illinois Audubon Bull. 194:23-37.

Kleen, V. M. 1980e. Breeding season: seasonal report no. 26. Illinois Dept. Conserv., Springfield 12 pp.

Kleen, V. M. 1980. The nesting season. June 1-July 31, 1980. Middlewestern prairie region. Amer. Birds 34(6):898-902.

Kleen, V. M. 1981a. Field Notes: 1980 Breeding season. Illinois Audubon Bull. 195:34-47.

Kleen, V. M. 1981b. Field Notes: 1980 Fall migration. Illinois Audubon Bull. 196.

Kleen, V. M. 1981c. Field Notes: 1981 Winter season. Illinois Audubon Bull. 197:28-39.

Kleen, V. M. 1981d. Field Notes: 1981 Spring migration. Illinois Audubon Bull. 198.

Kleen, V. M. 1981e. Breeding season: seasonal report no. 30. Illinois Dept. Conserv., Springfield 16 pp.

Kleen, V. M. 1982a. Field Notes: 1981 Breeding season. Illinois Audubon Bull. 199:21-40.

Kleen, V. M. 1982b. Field Notes: 1981 Fall migration. Illinois Audubon Bull. 200:38-58.

Kleen, V. M. 1982c. Field Notes: 1982 Winter season. Illinois Audubon Bull. 201:39-48.

Kleen, V. M. 1982d. Field Notes: 1982 Spring migration. Illinois Audubon Bull. 202:34-55.

Kleen, V. M. 1982e. Breeding season: seasonal report no. 34. Illinois Dept. Conserv., Springfield 14 pp.

Kleen, V. M. 1983a. Field Notes: 1982 Breeding season. Illinois Audubon Bull. 203:25-40.

Kleen, V. M. 1983b. Field Notes: 1982 Fall migration. Illinois Audubon Bull. 204:45-56.

Kleen, V. M. 1983c. Field Notes: 1983 Spring migration. Illinois Audubon Bull. 206:28-42.

Kleen, V. M. 1983d. Breeding season: seasonal report no. 38. Illinois Dept. Conserv., Springfield 14 pp.

Kleen, V. M. 1984. Field notes: the breeding season. Illinois birds and birding. pp. 14-20.

Lehman, R. N. 1979. A survey of selected habitat features of 95 bald eagle eagle nest sites in California. California Dept. Fish Game Wildl. Manage. Br. Admin. Rept. 79-1. 23 pp.

Lewis, H. F. 1929. The natural history of the double-crested cormorant (*Phalacrocorax auritus auritus* (Lesson)). H.C. Miller, Ottawa. 94 pp.

McCarty, W. F. 1928. A central Illinois night-heronry. Audubon Bull. 19:57-59.

Mengel, R. 1965. The birds of Kentucky. Ornith. Monogr. No. 3. 581 p.

Murchison, A. C. 1892. A quawk town. Oologist 9(7):177-178.

Nelson, E. W. 1877. Birds of north-eastern Illinois. Bull. Essex Inst. 8(9-12):90-155.

Palmer, R. S. 1962. Handbook of North American birds. Vol. 1. Loons through flamingos. Yale Univ. Press, New Haven. 567 pp.

Reilly, E. M., Jr. 1968. The Audubon illustrated handbook of American birds. McGraw-Hill Book Co., New York 523 pp.

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. Condor 82(3):309-313.

Ridgway, R. 1913. The ornithology of Illinois. State Laboratory of Natural History. Vol. 1. viii + 520 pp. + xxxii plates.

Robbins, C. S. 1981. Effect of time of day on bird activity. Stud. Avian Biol. No. 6:275-286.

Shannon, C. E. and W. Weaver. 1949. The mathematical theory of communication. University of Illinois press, Urbana 177 pp.

Smith, H. and P. Parmalee. 1955. A distributional check-list of the birds of Illinois. Illinois State Mus. Pop. Sci. Ser. 4:1-62.

Snow, C. 1973. Southern bald eagle *Haliaeetus leucocephalus leucocephalus* and northern bald eagle *haliaeetus leucocephalus alascanus*. Habitat Mange. Ser. Endangered Species Tech. Note. U. S. Bur. Land Manage. Rept. No. 5. 57 pp.

Sousa, P. J. 1982. Habitat suitability index models: veery. U.S. Dept. Interior, Fish Wildl. Serv. FWS/OBS-82/10.22. v + 12 pp.

Southern, W. E. 1963. Winter populations, behavior, and seasonal dispersal of bald eagles in northwestern Illinois. Wilson Bull. 75(1):42-55.

Stalmaster, M. V., and J. R. Newman. 1978. Behavioral responses of wintering bald eagles to human activity. J. Wildl. Manage. 42(3):506-513.

Steenhof, L. 1978. Management of wintering bald eagles. U. S. Fish Wildl. Serv. FWS/OBS 78/79. 59 pp.

Steenhof, K., S. S. Berlinger, and L. H. Fredrickson. 1980. Habitat use by wintering bald eagles in South Dakota. J. Wildl. Manage. 44(4):798-805.

Terres, J. K. 1980. The Audubon Society encyclopedia of North American birds. Alfred A. Knopf, New York. 1109 pp.

U.S. Department of the Interior, Fish and Wildlife Service [USDI, FWS]. 1982. Endangered and threatened wildlife and plants; review of vertebrate wildlife for listing as endangered and threatened species. Federal Register 47(251):58454-58460.

APPENDICES

Appendix 1.

TAXONOMIC ORDER OF OBSERVED BIRD SPECIES
FAP 412

FAMILIY Gaviidae		
	Common Loon	*Gavia immer*
FAMILY Phalacrocoracidae		
	Double-crested Cormorant	*Phalacrocorax auritus*
FAMILY Ardeidae		
	Great Blue Heron	*Ardea herodias*
	Great Egret	*Casmerodius albus*
	Green-backed Heron	*Butorides striatus*
FAMILY Anatidae		
Subfamily Anserinae		
	Tribe Anserini	
	Snow Goose	*Chen cearulescens*
	Canada Goose	*Branta canadensis*
Subfamily Anatinae		
	Tribe Cairinini	
	Wood Duck	*Aix sponsa*
	Tribe Anatini	
	Mallard	*Anas platyrhynchos*
	Blue-winged Teal	*Anas discors*
	Northern Shoveler	*Anas clypeata*
	Gadwall	*Anas strepera*
	American Wigeon	*Anas americana*
	Tribe Aythyini	
	Ring-necked Duck	*Aythya collaris*
	Scaup sp.	*Aythya marila or affinis*
	Tribe Oxyurini	
	Ruddy Duck	*Oxyura jamaicensis*

FAMILY Cathartidae

Turkey Vulture	*Cathartes aura*

FAMILY Accipitridae

Subfamily Accipitrinae

Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striatus*
Cooper's Hawk	*Accipiter cooperii*
Red-tailed Hawk	*Buteo jamaicensis*
Rough-legged Hawk	*Buteo lagopus*

FAMILY Falconidae

American Kestrel	*Falco sparvarius*
Peregrine Falcon	*Falco peregrinus*

FAMILY Phasianidae

Subfamily Phasianinae

Ring-necked Pheasant	*Phasianus colchicus*

Subfamily Odontophorinae

Northern Bobwhite	*Colinus virginianus*

FAMILY Rallidae

Sora	*Porzana carolina*

FAMILY Charadriidae

Lesser Golden Plover	*Pluvialis dominica*
Semipalmated Plover	*Charadrius semipalmatus*
Killdeer	*Charadrius vociferus*

FAMILY Scolopacidae

Greater Yellowlegs	*Tringa melanoleuca*
Lesser Yellowlegs	*Tringa flavipes*
Solitary Sandpiper	*Tringa solitaria*
Spotted Sandpiper	*Actitus macularia*
Least Sandpiper	*Calidris minutilla*
Pectoral Sandpiper	*Calidris melanotos*
Long-billed Dowitcher	*Limnodromus scolopaceus*
Common Snipe	*Gallinago gallinago*
American Woodcock	*Scolopax minor*

FAMILY Laridae

Ring-billed Gull	*Larus delawarensis*

FAMILY Columbidae

Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*

FAMILY Cuculidae

Black-billed Cuckoo	*Coccyzus erythropthalmus*
Yellow-billed Cuckoo	*Coccyzus americanus*

FAMILY Strigidae

Eastern Screech-Owl	*Otus asio*
Great Horned Owl	*Bubo virginianus*
Barred Owl	*Strix varia*
Short-eared Owl	*Asio flammeus*

FAMILY Caprimulgidae

Whip-poor-will	*Caprimulgus vociferus*

FAMILY Apodidae

Chimney Swift	*Chaetura pelagica*

FAMILY Trochilidae

Ruby-throated Hummingbird	*Archilocus colubris*

FAMILY Alcedinidae

Belted Kingfisher	*Ceryle alcyon*

FAMILY Picidae

Red-headed Woodpecker	*Melanerpes erythrocephalus*
Red-bellied Woodpecker	*Melanerpes carolinus*
Yellow-bellied Sapsucker	*Sphyrapicus varius*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*

FAMILY Tyrannidae

Eastern Wood-Pewee	*Contopus virens*
Alder Flycatcher	*Empidonax alnorum*
Least Flycatcher	*Empidonax minimus*
Eastern Phoebe	*Sayornis phoebe*
Great Crested Flycatcher	*Myiarchus crinitus*
Eastern Kingbird	*Tyrannus tyrannus*

FAMILY Alaudidae

Horned Lark	*Eremophila alpestris*

FAMILY Hirundinidae

Purple Martin	*Progne subis*
Tree Swallow	*Tachycineta bicolor*
No. Rough-winged Swallow	*Stelgidopteryx serripennis*
Barn Swallow	*Hirundo rustica*

FAMILY Corvidae

Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachyrhynchos*

FAMILY Paridae

Black-capped Chickadee	*Parus atricapillus*
Tufted Titmouse	*Parus bicolor*

FAMILY Sittidae

White-breasted Nuthatch	*Sitta carolinensis*

FAMILY Certhiidae

Brown Creeper	*Certhia americana*

FAMILY Troglodytidae

Carolina Wren	*Thryothorus ludovicianus*
House Wren	*Troglodytes aedon*
Winter Wren	*Troglodytes troglodytes*
Sedge Wren	*Cistothorus platensis*
Marsh Wren	*Cistothorus palustris*

FAMILY Muscicapidae

Subfamily Sylviinae

Golden-crowned Kinglet	*Regulus satrapa*
Ruby-crowned Kinglet	*Regulus calendula*

Subfamily Turdinae

Eastern Bluebird	*Siala sialis*
Veery	*Catharus fuscescens*
Gray-cheeked Thrush	*Catharus minimus*
Swainson's Thrush	*Catharus ustulatus*
Hermit Thrush	*Catharus guttatus*
Wood Thrush	*Hylocichla mustelina*
American Robin	*Turdus migratorius*

FAMILY Mimidae

Gray Catbird	*Dumetella carolinensis*
Brown Thrasher	*Toxostoma rufum*

FAMILY Bombycillidae

Cedar Waxwing	*Bombycilla cedrorum*

FAMILY Sturnidae

European Starling	*Sturnus vulgaris*

FAMILY Vireonidae

White-eyed vireo	*Vireo griseus*
Yellow-throated Vireo	*Vireo flavifrons*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*vireo olivaceus*

FAMILY Emberizidae

Subfamily Parulinae

Blue-winged Warbler	*Vermivora pinus*
Tennessee Warbler	*Vermivora peregrina*
Orange-crowned Warbler	*Vermivora celata*
Nashville Warbler	*Vermivora ruficapilla*
Northern Parula Warbler	*Parula americana*
Yellow Warbler	*Dendroica petechia*
Chestnut-sided Warbler	*Dendroica pensylvanica*
Magnolia Warbler	*Dendroica magnolia*
Cape May Warbler	*Dendroica tigrina*
Black-throated Blue Warb.	*Dendroica caerulescens*
Yellow-rumped Warbler	*Dendroica coronata*
Black-troated Green Warb.	*Dendroica virens*
Palm Warbler	*Dendroica palmarum*
Blackpoll Warbler	*Dendroica striata*
Black and White Warbler	*Mniotilta varia*
American Redstart	*Setophaga ruticilla*
Ovenbird	*Seiurus aurocapillus*
Northern Waterthrush	*Seiurus noveboracensis*
Louisiana Waterthrush	*Seiurus motacilla*
Common Yellowthroat	*Geothlypis trichas*

Subfamily Thraupinae

Scarlet Tanager	*Piranga olivacea*

Subfamily Cardinalinae

Northern Cardinal	*Cardinalis cardinalis*
Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Indigo Bunting	*Passerina cyanea*
Dickcissel	*Spiza americana*

Subfamily Emberizinae

Rufous-sided Towhee	*Pipilo erythropthalmus*
American Tree Sparrow	*Spizella arborea*
Chipping Sparrow	*Spizella passerina*
Field Sparrow	*Spizella pusilla*
Vesper Sparrow	*Pooecetes gramineus*
Savannah Sparrow	*Passerculus sandwichensis*
Grasshopper Sparrow	*Ammodramus savannarum*
Fox Sparrow	*Passerella iliaca*
Song Sparrow	*Melospiza melodia*
Lincoln's Sparrow	*Melospiza lincolnii*
Swamp Sparrow	*Melospiza georgiana*
White-throated Sparrow	*Zonotrichia albicollis*
White-crowned Sparrow	*Zonotrichia leucophrys*
Dark-eyed Junco	*Junco hyemalis*
Lapland Longspur	*Calcarius lapponicus*

Subfamily Icterinae

Red-winged Blackbird	*Agelaius phoeniceus*
Eastern Meadowlark	*Sturnella magna*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Northern Oriole	*Icterus galbula*

FAMILY Fringillidae

Pine Siskin	*Carduelis pinus*
American Goldfinch	*Carduelis tristis*

FAMILY Passeridae

House Sparrow	*Passer domesticus*

Appendix 2. Breeding bird density for singing males* calculated during the breeding season for agricultural habitats within the FAP 412 project area, U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

Bird species	number observed	projected total	C.D.	#/100a
American Kestrel	1	-	-	-
Ring-necked Pheasant	1	-	-	-
Killdeer	5	12.3	0.325	0.6
Rock Dove	5	24.6	0.203	1.2
Mourning Dove	2	-	-	-
Chimney Swift	5	16.4	0.305	0.8
Eastern Wood-Pewee	1	-	-	-
Horned Lark	122	147.6	0.827	7.4
Barn Swallow	6	20.5	0.293	1.0
American Crow	1	-	-	-
House Wren	2	7.4	0.270	0.4
American Robin	36	69.7	0.516	3.5
Gray Catbird	1	-	-	-
Brown Thrasher	2	-	-	-
European Starling	14	24.6	0.569	1.2
Cedar Waxwing	2	-	-	-
Warbling Vireo	1	-	-	-
Common Yellowthroat	6	16.4	0.305	0.8
Indigo Bunting	11	16.4	0.671	8.2
Dickcissel	9	12.3	0.732	0.6
Chipping Sparrow	12	49.2	0.244	2.5
Vesper Sparrow	9	41.0	0.220	2.0
Savannah Sparrow	2	-	-	-
Song Sparrow	16	16.4	0.915	0.8
Red-winged Blackbird	67	82.0	0.817	4.1
Eastern Meadowlark	1	-	-	-
Common Grackle	34	139.4	0.244	7.0
Brown-headed Cowbird	9	41.0	0.268	2.0
American Goldfinch	7	32.8	0.213	6.6
House Sparrow	94	110.7	0.849	5.5
Total: 30 species	484	880.7		56.2

* for breeding birds/100 acres multipy by 2 to account for females of territorial males

Appendix 3. Breeding bird density for singing males* calculated during the breeding season for woodland habitats within the FAP 412 project area, U. S. Route 51, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

Bird species	number observed	projected total	C.D.	#/100a
Ring-necked Pheasant	6	12.3	0.325	2.5
Mourning Dove	6	12.3	0.488	2.5
Yellow-billed Cuckoo	8	15.6	0.513	3.1
Chimney Swift	3	5.7	0.526	1.1
Red-headed Woodpecker	6	13.0	0.462	2.6
Red-bellied Woodpecker	6	5.2	0.962	1.0
Downy Woodpecker	11	24.6	0.447	4.9
Hairy Woodpecker	1	-	-	-
Northern Flicker	10	12.3	0.732	2.5
Barn Swallow	2	-	-	-
Eastern Wood-Pewee	14	16.4	0.512	5.5
Great Crested Flycatcher	15	16.4	0.915	3.3
Blue Jay	28	36.8	0.625	7.4
American Crow	8	0.8	8.75	0.4*
Black-capped Chickadee	8	24.6	0.284	4.9
Tufted Titmouse	8	16.4	0.488	3.3
White-breasted Nuthatch	10	20.5	0.488	4.1
House Wren	23	41.0	0.561	8.2
Wood Thrush	10	8.2	0.976	1.6
American Robin	21	32.8	0.610	6.6
Gray Catbird	5	24.6	0.203	4.9
Brown Thrasher	4	4.1	0.976	0.8
European Starling	2	-	-	-
Red-eyed Vireo	1	-	-	-
Ovenbird	1	-	-	-
Common Yellowthroat	5	1.6	0.610	1.6
Northern Cardinal	5	12.3	0.407	2.5
Rose-breasted Grosbeak	3	16.4	0.183	3.3*
Indigo Bunting	25	49.2	0.488	9.8
Rufous-sided Towhee	5	1.6	0.610	1.6
Field Sparrow	3	-	-	-
Song Sparrow	1	-	-	-
Red-winged Blackbird	5	9.3	0.536	1.9
Common Grackle	8	28.7	0.279	5.7
Brown-headed Cowbird	9	24.6	0.366	4.9
Northern Oriole	2	16.4	0.122	3.3*
American Goldfinch	2	-	-	-
House Sparrow	2	-	-	-
Totals: 38 species	292	503.7		96.1

* for breeding birds/100 acres multipy by 2 to account for females of territorial males

Appendix 4. Summary of total numbers of birds observed in agricultural and woodland habitats within the FAP 412 project area in all seasons, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

Bird species	Numbers of Birds Seen: Agricultural Census A	W	S	B	Woodland Census A	W	S	B
Green-backed Heron	-	-	-	-	-	-	1	-
Canada Goose	6	86	-	-	152	53	-	-
Mallard	6	-	-	-	11	-	-	-
Northern Harrier	5	4	1	-	3	-	-	-
Sharp-shinned Hawk	-	-	-	-	3	1	2	-
Cooper's Hawk	3	-	-	-	-	-	-	-
Red-tailed Hawk	5	-	4	-	5	1	-	-
Rough-legged Hawk	-	10	-	-	-	-	-	-
American Kestrel	-	4	2	1	1	-	-	-
Ring-necked Pheasant	1	6	1	1	2	1	14	6
Lesser Golden-Plover	55	-	543	-	-	-	-	-
Killdeer	11	-	13	5	15	-	1	-
Solitary Sandpiper	-	-	-	-	1	-	-	-
Pectoral Sandpiper	85	-	-	-	12	-	-	-
Common Snipe	-	1	-	-	-	-	-	-
American Woodcock	-	-	-	-	1	-	-	-
Ring-billed Gull	1	-	-	-	-	-	-	-
Rock Dove	96	66	20	5	-	-	-	-
Mourning Dove	1	-	8	2	-	1	5	6
Black-billed Cuckoo	-	-	-	-	1	-	-	-
Yellow-billed Cuckoo	-	-	-	-	5	-	1	8
Barred Owl	-	-	-	-	-	1	-	-
Whip-poor-will	-	-	-	-	-	-	1	-
Chimney Swift	2	-	24	5	-	-	2	3
Ruby-throated Hummingbird	-	-	-	-	1	-	-	-
Belted Kingfisher	-	-	-	-	2	-	3	-
Red-headed Woodpecker	1	2	7	-	1	-	14	6
Red-bellied Woodpecker	-	-	-	-	6	6	6	6
Yellow-bellied Sapsucker	-	-	-	-	10	-	-	-
Downy Woodpecker	-	-	-	-	10	10	14	11
Hairy Woodpecker	-	-	-	-	1	-	-	1
Northern Flicker	1	1	-	-	40	-	16	10
Eastern Wood-Pewee	-	-	-	1	-	-	1	14
Least Flycatcher	-	-	-	-	-	-	4	-
Eastern Phoebe	1	-	-	-	5	-	2	-
Great Crested Flycatcher	-	-	-	-	-	-	6	15
Eastern Kingbird	-	-	-	-	-	-	1	-
Horned Lark	247	439	284	122	-	-	-	-
Purple Martin	-	-	6	-	-	-	-	-
Tree Swallow	-	-	5	-	-	-	-	-
No. Rough-winged Swallow	-	-	3	-	-	-	-	-
Barn Swallow	-	-	22	6	-	-	-	2

(Appendix 4 continued on next page)

A=autumn, W=winter, S=spring, B=breeding

Appendix 4. Summary of total numbers of birds observed in agricultural and woodland habitats within the FAP 412 project area in all seasons, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

Bird species	Numbers of Birds Seen: Agricultural Census A	W	S	B	Woodland Census A	W	S	B
Blue Jay	3	-	25	-	36	15	81	28
American Crow	73	28	31	1	16	18	13	8
Black-capped Chickadee	-	1	1	-	58	14	16	8
Tufted Titmouse	-	-	-	-	19	13	14	8
White-breasted Nuthatch	-	-	-	-	18	13	13	10
Brown Creeper	-	-	-	-	8	-	-	-
Carolina Wren	-	-	-	-	-	-	1	-
House Wren	3	-	2	2	1	-	26	23
Winter Wren	-	-	-	-	11	-	-	-
Golden-crowned Kinglet	-	-	-	-	5	-	-	-
Ruby-crowned Kinglet	4	-	1	-	41	-	1	-
Eastern Bluebird	-	-	-	-	-	-	4	-
Veery	-	-	-	-	-	-	1	-
Gray-cheeked Thrush	-	-	-	-	1	-	1	-
Swainson's Thrush	-	-	-	-	2	-	-	-
Hermit Thrush	1	-	-	-	14	-	2	-
Wood Thrush	-	-	-	-	1	-	13	10
American Robin	7	-	128	36	221	-	44	21
Gray Catbird	-	-	-	1	11	-	2	5
Brown Thrasher	-	-	8	2	-	-	17	4
Cedar Waxwing	-	-	-	2	20	-	1	-
European Starling	1321	204	183	14	50	-	20	2
White-eyed Vireo	-	-	-	-	-	-	4	-
Yellow-throated Vireo	-	-	-	-	-	-	3	-
Warbling Vireo	-	-	-	1	-	-	-	-
Red-eyed Vireo	-	-	-	-	-	-	3	1
Blue-winged Warbler	-	-	-	-	-	-	2	-
Tennessee Warbler	-	-	1	-	-	-	25	-
Orange-crowned Warbler	-	-	-	-	2	-	-	-
Nashville Warbler	-	-	-	-	7	-	8	-
Northern Parula	-	-	-	-	1	-	-	-
Yellow Warbler	-	-	-	-	-	-	1	-
Chestnut-sided Warbler	-	-	-	-	1	-	-	-
Magnolia Warbler	-	-	-	-	4	-	2	-
Black-throated Blue Warb.	-	-	-	-	1	-	1	-
Cape May Warbler	-	-	1	-	-	-	-	-
Yellow-rumped Warbler	25	-	1	-	89	-	91	-
Black-throated Green Warb.	-	-	1	-	6	-	11	-
Palm Warbler	2	-	2	-	1	-	15	-
Blackpoll Warbler	-	-	-	-	-	-	1	-
Black-and-white Warbler	-	-	-	-	2	-	3	-
American Redstart	-	-	-	-	1	-	-	-
Ovenbird	-	-	-	-	2	-	3	1
Northern Waterthrush	-	-	1	-	1	-	2	-
Louisiana Waterthrush	-	-	-	-	-	-	2	-
Common Yellowthroat	2	-	5	6	5	-	5	5

(Appendix 4 concluded on next page)

Appendix 4. Summary of total numbers of birds observed in agricultural and woodland habitats within the FAP 412 project area in all seasons, LaSalle, Marshall, McLean, and Woodford counties, Illinois.

	Numbers of Birds Seen							
	Agricultural Census				Woodland Census			
Bird species	A	W	S	B	A	W	S	B
Scarlet Tanager	-	-	-	-	1	-	-	-
Northern Cardinal	-	-	1	-	2	4	15	5
Rose-breasted Grosbeak	-	-	-	-	2	-	10	3
Indigo Bunting	-	-	1	11	1	-	33	25
Dickcissel	-	-	-	9	-	-	-	-
Rufous-sided Towhee	1	-	1	-	1	-	7	5
American Tree Sparrow	-	26	-	-	-	35	-	-
Chipping Sparrow	-	-	9	12	-	-	-	-
Field Sparrow	1	-	-	-	-	-	11	3
Vesper Sparrow	3	-	12	9	-	-	-	-
Savannah Sparrow	1	-	16	2	-	-	-	-
Grasshopper Sparrow	1	-	-	-	-	-	-	-
Fox Sparrow	1	-	-	-	-	-	-	-
Song Sparrow	34	2	30	16	6	-	3	1
Lincoln's Sparrow	2	-	-	-	-	-	-	-
Swamp Sparrow	5	1	-	-	3	-	1	-
White-throated Sparrow	14	-	12	-	119	-	46	-
White-crowned Sparrow	6	-	2	-	-	-	-	-
Dark-eyed Junco	-	3	-	-	-	18	-	-
Lapland Longspur	-	2	-	-	-	-	-	-
Red-winged Blackbird	464	-	352	67	-	-	14	5
Eastern Meadowlark	7	-	11	1	-	-	-	-
Common Grackle	152	-	248	34	6	-	24	8
Brown-headed Cowbird	7	-	34	9	-	-	28	9
Northern Oriole	-	-	-	-	-	-	2	2
American Goldfinch	35	-	21	7	13	-	19	2
House Sparrow	698	601	303	94	-	8	2	2
Total number individuals:	3400	1487	2387	484	1098	212	761	292
Total number species:	45	19	44	30	64	17	68	38

Appendix 5. Summary of total numbers of birds observed in Special Habitats SH1 and SH2 within the FAP 412 project area in all seasons, McLean and Woodford counties, Illinois.

	Numbers of Birds Seen							
	Special Habitat SH1				Special Habitat SH2			
Bird species	A	W	S	B	A	W	S	B
Great Blue Heron	3	-	-	-	-	-	-	-
Green-backed Heron	-	-	-	1	-	-	-	-
Canada Goose	7	-	2	-	6	-	-	-
Northern Harrier	-	-	-	1	-	-	-	-
Red-tailed Hawk	1	-	-	2	2	1	1	-
Rough-legged Hawk	-	1	-	-	-	-	-	-
Ring-necked Pheasant	5	2	3	10	2	-	2	2
Northern Bobwhite	-	-	4	1	-	-	-	-
Killdeer	2	-	4	-	-	-	-	-
Mourning Dove	-	-	4	-	-	-	1	-
Barred Owl	-	-	-	-	1	-	-	-
Chimney Swift	-	-	1	-	-	-	1	-
Belted Kingfisher	1	-	-	-	-	-	-	-
Red-headed Woodpecker	2	-	2	-	2	-	-	-
Downy Woodpecker	2	1	2	-	2	-	-	-
Hairy Woodpecker	1	-	-	-	-	-	-	-
Northern Flicker	2	-	4	1	-	-	-	-
Eastern Wood-Pewee	-	-	-	1	-	-	-	1
Eastern Phoebe	2	-	-	-	1	-	-	-
Great Crested Flycatcher	-	-	-	3	-	-	-	2
Eastern Kingbird	-	-	-	1	-	-	1	-
Horned Lark	1	-	-	-	-	-	-	-
Tree Swallow	-	-	1	-	-	-	-	-
Barn Swallow	-	-	-	-	-	-	-	2
No. Rough-winged Swallow	-	-	-	3	-	-	-	-
Blue Jay	7	-	12	2	5	3	8	1
American Crow	3	2	-	-	4	-	-	-
Black-capped Chickadee	7	1	4	-	4	1	1	-
White-breasted Nuthatch	3	-	-	-	1	-	-	2
Marsh Wren	1	-	-	-	-	-	-	-
Golden-crowned Kinglet	3	-	-	-	3	-	-	-
Ruby-crowned Kinglet	3	-	-	-	5	-	-	-
Veery	-	-	1	-	-	-	1	-
Hermit Thrush	-	-	-	-	3	-	-	-
Wood Thrush	-	-	-	-	-	-	-	1
American Robin	29	-	13	1	-	-	-	4
Gray Catbird	-	-	2	1	-	-	3	1
Brown Thrasher	-	-	2	1	-	-	1	-
Cedar Waxwing	11	-	-	-	9	-	-	-
European Starling	13	-	5	-	-	-	-	-

(Appendix 5 concluded on next page)

A=autumn, W=winter, S=spring, B=breeding

Appendix 5. Summary of total numbers of birds observed in Special Habitats SH1 and SH2 within the FAP 412 project area in all seasons, McLean and Woodford counties, Illinois.

	Numbers of Birds Seen							
	Special Habitat SH1				Special Habitat SH2			
Bird species	A	W	S	B	A	W	S	B
White-eyed Vireo	-	-	-	-	-	-	-	1
Red-eyed Vireo	-	-	-	-	-	-	1	1
Tennessee Warbler	-	-	9	-	-	-	1	-
Nashville Warbler	-	-	9	-	-	-	3	-
Yellow Warbler	-	-	6	-	-	-	-	-
Magnolia Warbler	-	-	1	-	-	-	-	-
Black-throated Blue Warb.	-	-	-	-	2	-	-	-
Yellow-rumped Warbler	5	-	16	-	-	-	-	-
Palm Warbler	1	-	6	-	-	-	4	-
Common Yellowthroat	-	-	5	2	-	-	2	1
Northern Cardinal	1	-	2	1	-	1	2	1
Rose-breasted Grosbeak	-	-	4	-	-	-	1	-
Indigo Bunting	-	-	6	4	-	-	5	2
Rufous-sided Towhee	2	-	3	-	1	-	3	2
American Tree Sparrow	1	-	-	-	-	-	-	-
Field Sparrow	22	15	5	1	-	-	5	5
Savannah Sparrow	-	-	-	1	-	-	-	-
Grasshopper Sparrow	-	-	-	1	-	-	-	-
Fox Sparrow	2	-	-	-	-	-	-	-
Song Sparrow	20	-	2	1	2	-	-	-
Swamp Sparrow	3	-	-	-	2	-	-	-
White-throated Sparrow	-	-	-	-	4	-	4	-
Dark-eyed Junco	-	-	-	-	1	-	-	-
Red-winged Blackbird	25	-	25	3	1	-	-	-
Eastern Meadowlark	20	-	8	2	-	-	5	-
Common Grackle	55	-	2	1	-	-	1	-
Brown-headed Cowbird	45	-	14	1	-	-	8	1
Northern Oriole	-	-	2	-	-	-	3	-
American Goldfinch	13	-	15	3	3	2	8	2
Total number individuals:	324	22	206	50	66	8	76	32
Total number species:	36	6	36	26	23	5	26	18

Appendix 6. Summary of total numbers of birds observed in Special Habitats SH3 and SH4 within the FAP 412 project area in all seasons, McLean, and Woodford, counties, Illinois.

Bird species	Special Habitat SH3				Special Habitat SH4			
	A	W	S	B	A	W	S	B
Great Blue Heron	3	-	1	-	-	-	4	3
Great Egret	-	-	-	-	-	-	1	-
Green-backed Heron	-	-	-	2	-	-	1	1
Canada Goose	21	-	9	-	350	17	31	1
Wood Duck	-	-	-	-	-	-	2	-
Mallard	70	-	3	3	550	-	7	5
Blue-winged Teal	-	-	-	-	4	-	-	-
Northern Shovelor	-	-	-	-	3	-	-	-
Gadwall	-	-	-	-	2	-	-	-
American Wigeon	-	-	-	-	6	-	-	-
Ring-necked Duck	-	-	-	-	2	-	-	-
Turkey Vulture	-	-	-	-	1	-	-	-
Cooper's Hawk	-	-	-	-	-	-	-	1
Red-tailed Hawk	-	-	-	-	1	-	1	-
Rough-legged Hawk	1	-	-	-	-	-	-	-
Ring-necked Pheasant	2	-	3	2	1	-	3	2
Sora	-	-	1	-	-	-	-	-
Semipalmated Plover	-	-	-	-	-	-	2	-
Killdeer	3	-	2	3	19	-	-	4
Greater Yellowlegs	-	-	-	-	3	-	1	-
Lesser Yellowlegs	-	-	-	-	1	-	-	-
Spotted Sandpiper	-	-	6	-	-	-	-	-
Solitary Sandpiper	30	-	4	-	-	-	1	-
Least Sandpiper	-	-	-	-	-	-	6	-
Long-billed Dowitcher	-	-	-	-	1	-	-	-
Common Snipe	-	-	-	-	1	-	-	-
American Woodcock	-	-	5	-	-	-	-	-
Mourning Dove	-	-	5	4	-	-	1	1
Rock Dove	-	4	-	-	-	-	-	-
Yellow-billed Cuckoo	-	-	-	1	-	-	-	-
Great Horned Owl	1	-	-	-	-	-	-	-
Belted Kingfisher	1	-	-	-	-	-	-	1
Red-bellied Woodpecker	-	-	-	-	-	1	-	-
Downy Woodpecker	1	2	-	-	-	2	1	2
Hairy Woodpecker	-	-	-	-	1	-	-	-
Northern Flicker	-	-	2	1	3	-	1	2
Eastern Wood-Pewee	-	-	-	-	-	-	-	1
Alder Flycatcher	-	-	-	2	-	-	-	-
Great Crested Flycatcher	-	-	-	1	-	-	-	1
Eastern Kingbird	-	-	-	-	-	-	1	1
Tree Swallow	-	-	1	-	-	-	3	-

(Appendix 6 continued on next page)

A=autumn, W=winter, S=spring, B=breeding

Appendix 6. Summary of total numbers of birds observed in Special Habitats SH3 and SH4 within the FAP 412 project area in all seasons, McLean, and Woodford, counties, Illinois.

Bird species	Special Habitat SH3				Special Habitat SH4			
	A	W	S	B	A	W	S	B
Barn Swallow	-	-	1	-	-	-	2	1
Blue Jay	2	-	1	4	5	3	14	4
American Crow	-	-	-	-	11	4	6	-
Black-capped Chickadee	-	-	-	-	27	19	1	-
Tufted Titmouse	-	-	-	-	-	6	1	1
White-breasted Nuthatch	-	-	-	-	-	3	-	-
Brown Creeper	-	-	-	-	-	3	-	-
House Wren	-	-	-	-	-	-	2	-
Sedge Wren	-	-	-	-	1	-	-	-
Marsh Wren	-	-	-	1	1	-	-	-
Golden-crowned Kinglet	-	-	-	-	7	-	-	-
Ruby-crowned Kinglet	3	-	-	-	3	-	-	-
Hermit Thrush	-	-	-	-	5	-	-	-
American Robin	-	-	3	4	150	-	6	3
Gray Catbird	-	-	1	2	-	-	5	-
Brown Thrasher	-	-	-	1	-	-	1	2
Cedar Waxwing	7	-	-	-	4	-	-	-
European Starling	180	-	2	25	5	-	8	-
Warbling Vireo	-	-	1	-	-	-	-	-
Tennessee Warbler	-	-	1	-	-	-	2	-
Nashville Warbler	-	-	3	-	-	-	4	-
Yellow Warbler	-	-	1	2	-	-	2	-
Black-throated Green Warb.	-	-	1	-	-	-	1	-
Yellow-rumped Warbler	1	-	-	-	18	-	-	-
Palm Warbler	-	-	-	-	-	-	2	-
Northern Waterthrush	-	-	-	-	-	-	3	-
Common Yellowthroat	-	-	8	2	-	-	10	8
Northern Cardinal	1	-	1	-	-	2	1	2
Rose-breasted Grosbeak	-	-	1	-	-	-	3	1
Indigo Bunting	-	-	-	1	-	-	6	3
Rufous-sided Towhee	-	-	2	-	2	-	2	-
American Tree Sparrow	-	208	-	-	-	8	-	-
Field Sparrow	5	-	1	1	-	-	2	3
Song Sparrow	16	-	-	3	7	-	3	3
Swamp Sparrow	42	-	-	-	7	3	-	-
White-throated Sparrow	12	-	-	-	4	-	6	-
White-crowned Sparrow	1	-	-	-	-	-	2	-
Dark-eyed Junco	6	2	-	-	2	-	-	-
Red-winged Blackbird	50	-	12	18	23	-	34	13
Eastern Meadowlark	3	-	1	-	-	-	-	-

(Appendix 6 concluded on next page)

A=autumn, W=winter, S=spring, B=breeding